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The Pennsylvania Rail Order

Another Conference of Steel Manufacturers

Some Months of Quietness Ahead of the Trade— More Idle Blast Furnaces

The announcement by the Pennsylvania Railroad that it has given orders for 150,000 tons of rails for 1911 is the chief event of the week. Contracts have not been signed, nor has the distribution among the mills been finally decided. The Steel Corporation mills and the Buffalo and the three independent Pennsylvania mills are expected to share in about the same percentages as for 1910, but points in the terms have not yet been agreed upon. The order is larger than was looked for, but is less than the total placed by the Pennsylvania Railroad for this year.

Following a meeting of the directors of the American Iron and Steel Institute, a conference is being held in New York, as this is written, in which other steel manufacturers are also participating. Recent changes in conditions are being canvassed, but no action affecting prices is anticipated at this time.

There is no dissent among leaders in the trade from the view that a quiet time is ahead of the industry. The more hopeful look for improvement by the spring of 1911. November has shown a gradual slowing down in the rate of production, and this is expected to continue through December. That the readjustment now going on will extend further and in a way that will eventually affect labor is a growing conviction.

November showed a smaller volume of structural business than any month in the year, but railroad contracts now pending should make a better record for December. At Chicago 40,000 to 50,000 tons of steel will be required for buildings whose erection is likely to be financed in the next six months. One of these is the Underwriters' Building, which will take 12,000 tons. The New York State Prison Commission will open bids December 15 for a building requiring 10,000 tons.

Plate manufacturers, whose business has lagged for months, find some encouragement in recent car and locomotive contracts. Lake shipyards have had some good repair orders, but cannot count greatly on new vessel work for the winter.

The wire trade is somewhat more active following a lull, but prices show further irregularity.

A number of independent sheet mills have sold their capacity for the next three months, but current business is only moderate, and on good sized contracts a

Mechanical and Civil Engineers.

2.10c. basis for No. 28 black sheets has been reached.

Under the new Pittsburgh basing, semifinished steel has been more uniformly held at \$23, Pittsburgh, for billets and \$24.50 for sheet bars.

Pig iron markets are settling into greater quietness as the year end approaches. More Southern iron has been sold at \$11, Birmingham, for the first quarter of next year. An offer of \$10.50, made by a foreign syndicate, for 50,000 tons of Southern No. 2, found no producer willing to entertain it, but it may have inspired reports of shading below \$11. Two blast furnaces of the Tennessee Company have gone out this week and a number of merchant furnaces have been added to the idle list, including one in New Jersey, one in New York and two in Virginia.

Discussion of the question of Lake Superior ore prices for 1911 brings out views ranging from a reduction of 50c. to a reaffirmation of this year's basis. Cleveland selling firms look for larger shipments next year to Eastern furnaces in view of the strong demand in England and Germany for Swedish and Spanish ores at high prices, and the great advance in ocean freights. The ore canceled by Eastern furnace companies this year was all readily resold abroad, but it is a little early to predict that high freights and high ore prices on the other side will likewise be a factor when Lake ore sales are made for 1911.

Tin has again advanced above 37c. The November statistics, showing deliveries of 3800 tons, were about 25 per cent. beyond expectations.

Efficiency Engineers to the Help of the Railroads

That they have not applied scientific methods to the management of their business, and, that if they should do so, economies would be realized, making it unnecessary to advance freight rates—this was in substance the case of the Eastern shippers against the railroads at the hearings in Washington last week. Some of the statements made in the heat of argument were of the same species of accusation and complaint that have grown so common in this country of late. They reminded us again of the way in which the American people have given themselves up to the business of bringing charges against the existing order of things, political, industrial, commercial and financial. The tariff, the currency, the corporations, the politicians, the labor unions, the farmers, the automobile and, by no means least, the railroads—all have been blamed for conditions which have seriously disturbed the minds of the people ever since the average desire for material satisfactions has been so rapidly outstripping the average income.

It is not new to hear that the efficiency of our industrial operations is not what it should be. The railroads are in numerous company in being under this accusation. The doctors of efficiency, whose excellent work in many fields is greatly to be commended, have long brought almost as sweeping an indictment as the Washington one of last week, against the heads of manufacturing industries generally. They have told us that the managers of industrial companies are as a rule more at fault for the lack of efficiency in their workmen than the workmen themselves. In the rela-

tively few plants in which outside efficiency engineers have had opportunity to apply their methods, particularly in those of the larger companies, they have had some notable successes in increasing output and reducing unit costs. So they assert with a good deal of confidence—or some of them asserted at Washington—that the railroads could save \$1,000,000 a day by scientific management. But so far as any "scientific" basis for this estimate is concerned, it might, with almost equal reason, have been put at \$2,000,000 a day.

Yet the advice given the railroads by witnesses experienced in other fields than railroad management is not by that token to be disregarded. Nor will it be competent for the railroads to retort that if all industrial companies were efficiently organized and operated the latter would so lower their costs that higher freights would be no burden. Railroad presidents may have been satirical in telling of the large rewards awaiting those who shall show the way to a tithe of the economies the roads are charged with neglecting. At the same time it may well be that they have found food for thought.

It is well, too, that such wide publicity has been given to this phase of the subject. It is the first time in all the multiplied discussions of our high prices that economy has been seriously suggested as a remedy. We have been simply running the circle of higher prices, higher wages, and then higher wages, higher prices. The cure for high wage and material costs, we have steadily been told, lies in a higher charge for the finished product. The railroads have simply used the argument made to their hand. Now that economy in production has been pointed to as the desideratum, we may hear much more of lower prices as the way out of present economic troubles.

The Position of Spelter

The present spelter situation is commanding much attention among market statisticians who are not agreed as to the reason for the recent advances in price. While it is generally believed that leading smelters and some large sellers are in a measure manipulating the market, it is generally conceded that the smelters are warranted in holding out for higher prices. Their claim that, with increased cost of labor and ore, spelter cannot be produced at a profit under 6 cents a pound is worth some consideration.

As to the restriction in production affecting the supply, it is admitted that while some retorts have been closed down a considerable stock, visible and invisible, has been carried over from last year. Estimates as to the probable output of prime Western spelter made at this time are not based on actual figures, as none have been given out by the smelters, and not until the end of the year will the actual statistics of production be known. It is known, however, that spelter has not gone into consumption very rapidly during the last three months. That the prevailing price of the metal is not so very high as compared with the average price of some years is shown by the following table of New York quotations, averaged from reports in *The Iron Age*:

Year.	Cents.	Year.	Cents.
1904.....	5.11	1907.....	6.05½
1905.....	5.89¾	1908.....	4.73¾
1906.....	5.25¼	1909.....	5.50¾

The daily price of spelter in New York last week was steadily 5.95c. Some statisticians make comparisons on spelter prices with lead quotations, but not since 1908 has spelter been sold as low as lead, and the former metal has been gradually advancing since that year. Accordingly, any argument based on the price of the two metals should not carry much weight. Whatever the Government statistics may show as to the production and consumption during the year 1910, it is safe to assume that those who control the situation will keep the price up until those figures appear.

It is claimed by some that the present condition of the spelter market is owing, primarily, to a shortage of the metal in Europe, and that there is already the prospect that a shortage may arise in this country. In addition, it is stated that the smelting capacity is out of line, being excessive, a condition which also confronts other branches of the metallurgical industry.

Furthermore, the consumption of spelter has greatly increased within the last decade, in consequence of which smelters were built in the newly discovered Kansas gas fields. Gas was of course a cheap and satisfactory fuel, but of late the supply has been diminishing. Changes that are deemed necessary to meet the present and prospective conditions in the Kansas district, in which more than half of the smelting retorts are located, are estimated to require two years to accomplish. A continued increase in the consumption of spelter is confidently predicted, in which event, taking into consideration the other factors mentioned above, it would appear that an appreciation in the price of this metal is inevitable in the near future.

Machinery Buying Systems and Prices

Machine tool prices have not been influenced by the let-up in the demand following the cancellation of orders and the cessation of buying on the part of the automobile people and by the long absence from the market of the railroads as large buyers. It has been fully demonstrated that reduced prices in the machinery trade have little effect in increasing the volume of sales. During very good times the cost to the purchaser has been of small moment as compared with deliveries. When the depression came, in 1908, price was a small factor in inducing business; so little existed that no stimulus could be effective. In recent months, a period of demand ranging from normal to very moderate, purchasers have again shown that they are ready to pay the price for what they need, and that their ideas of their wants are on a higher plane than ever before. The tendency of modern machinery buying, to get the right tool, whether cheap or expensive, which has been mentioned from time to time, has been given an even stronger accent. The work to be done is studied more carefully. Pains are taken that a machine be secured which will accomplish the task in the most economical manner, taking into account all such elements as rapidity of manufacture, quality of product and the labor cost, together with the price of the equipment under consideration. The mere fact that a machine is very expensive as an initial investment does not count, if the other factors warrant the expenditure. Occasionally the error is made, in the zeal to get the best, of purchasing costly tools, where greater economy would have followed the use of a cheaper type of machine. The sub-

ject is given intelligent thought by the cost department and the office management, as well as by the mechanical department. The whole effort is toward a more nearly perfect production unit, a fact which, naturally, puts the builder of machinery on a sounder basis as to his prices. His fight is on the merits of his machines in their relation to the work. If his price is maintained, the same to all, the buyer recognizes the fact and respects it.

In connection with the modern practice in buying, some users fall into the error of believing that they know the complete field of machinery from which to make a selection. They fail to take into account that new tools are coming on the market constantly, the builders of which cannot get into touch with immediate buyers of equipment, because of their ignorance of who the buyers are. To send out broadcast information as to requirements brings a largely increased knowledge upon which to establish the best equipped plant. Those concerns that seek the general information have the advantage of those pursuing the opposite policy. Instances arise constantly to prove this fact, in the experience of the customer as well as of the manufacturer and dealers. Very often the builder will be able to assist his customers richly in the creation of economical methods of production. Builders are specialists, and the services of their experts are at the disposal of buyers, constituting an important part of the sales system. Many cases could be cited to show that this engineering advice has been followed by large economies. It is therefore an element to be taken into consideration in the selection of equipment. The wider its scope the more valuable it may be. Certain officials having to do with the purchasing departments try to avoid publicity on the ground that they are well enough in touch with conditions in the machinery market, through the salesmen whom they are accustomed to seeing regularly and through other users of machinery, and because they dislike the flood of information by letter, circular, catalogue and visiting representatives which publicity brings with it. It is an erroneous conclusion, for the information rarely fails to be of actual financial value to their houses.

The Use of Re-export Tin Plate

As one tariff law of the United States closed the domestic market to the Welsh tin plate mills, so our cousins across the water seem unable to give up the idea that another may open it again. Interest has lately been aroused in England over an increase in Welsh tin plate exports to the United States, and the suggestion is made that the Payne-Aldrich tariff law is responsible. It is needless to state that such is not the case. Indeed, its reduction in the duty from 1.5 cents to 1.2 cents per pound was voluntarily suggested by the tin plate manufacturers at the Ways and Means Committee hearing as feasible, without introducing the likelihood of disturbance in the industry. Whatever our imports of Welsh tin plate amount to, they are, as they have been for more than a decade, almost solely for re-export purposes.

The increase in British tin plate exports to the United States may be stated briefly to consist in this, that while in both 1907 and 1908 the year's exports amounted to 60,000 gross tons, in 1909 this quantity was reached in eleven months, while this year the

quantity was reached in nine months. British tin plate exports to the United States in the first nine months of this year amounted to 60,857 gross tons, and in October to 5216 tons, making a total for ten months of 66,073 tons. It should be observed that the October exports were not large, the 5216 tons comparing with an average of 6960 tons during the preceding nine months, and with 8644 tons in October of last year.

We have used the British figures in making the comparison because for a given month the British figures become available somewhat earlier than our own, while of course for the same month they reflect changes in the movement more promptly, by the time the material consumes in crossing the ocean. Over a period of time our own statistics agree quite closely with the British, as we import very little tin plate from other sources. Our tin plate imports in the past four fiscal years have averaged 63,900 gross tons per year, or at the rate of about 12,000,000 pounds per month. The imports during July, August and September this year and last have been as follows, in pounds:

	1909.	1910.
July	11,559,955	24,170,637
August	11,358,453	9,120,322
September	9,735,998	6,091,330
Totals	32,654,406	39,382,289

It will be observed that were it not for the quite unusual total in July last the average of the quarter would be considerably lower than in the corresponding quarter of last year.

Thus, on the whole, there is no evidence of any sudden increase in our imports of tin plates. The statistics of the drawback trade in tin plate have not lately been studied with the care which used to be given to them when hopes were entertained that a large part of this trade might be captured by the American mills. A hope of this sort has recently been revived, and the drawback figures are given a fresh interest. As no attention has been paid to them for several years we give the full statistics for the past 13 years, beginning with the fiscal year 1898, which was the last year in which there were any considerable tin plate imports for strictly domestic consumption.

In the first column of the table below is stated the number of pounds of tin plate upon which drawback was allowed during the fiscal year named. The allowance is made, not upon the precise quantity of tin plate existing in the exported articles, which comprise chiefly cans containing oil, fruit, meat, &c., carpet sweepers and lined cases, but upon the amount of tin plate it is computed is required in the manufacture, allowances being made for waste. In the second column is stated the difference between the imports of tin plate in the year named and the drawback of tin plate in the same year.

Tin Plate, Fiscal Years, Pounds.

Drawback.	Excess of imports.	Drawback.	Excess of imports.
1898..137,897,570	33,764,775	1905..151,677,870	9,388,950
1899..122,906,682	*14,421,856	1906..120,455,345	364,387
1900..125,269,156	22,694,648	1907..102,712,630	39,816,776
1901..127,261,883	*9,381,571	1908..158,911,418	*18,171,446
1902..125,340,511	73,655,575	1909..116,829,347	482,827
1903..123,088,272	*13,174,979	1910..141,732,141	12,834,458
1904..111,658,352	15,251,008		

* Excess of drawback over imports.

It will be observed that the drawback trade has fluctuated in volume in such an irregular way that no

generalization can be made as to what has been the average in the most recent years, or whether there has been an increase or decrease in the past few years. Were the statistics extended farther back the confusion would not be reduced. The first drawback allowance was made in 1884, upon 97,415,089 lb., and in 1889 the maximum of the whole period was recorded, 166,087,740 lb. The movement decreased to 119,928,083 lb. in 1892, only to increase to 161,758,361 lb. in 1894.

In October, 1902, an arrangement was effected between the leading tin plate interest and the organized workmen whereby the latter would work at reduced wages upon tin plate intended for what was conveniently called the "rebate trade," the material being sold to consumers upon the usual terms, but an allowance being made the consumer upon the exportation of packages, &c., made from the tin plate. The amount of business so done during the ensuing five years probably averaged between 25,000,000 and 50,000,000 lb. per year, and to this extent the regular drawback business in important tin plate was reduced. It will be observed from the table, however, that no great reduction from the previous rate was effected.

Of late there does not seem to have been so much of this rebate business done by the American mills, but it is possible that greater efforts will be put forth in the future to take a larger share of it. The chief obstacle to making the close terms necessary is the high labor cost in the American mills, compared with the Welsh. Since the termination of relations between the Amalgamated Association and the leading interest, some seventeen months ago, there is no wage concession on this class of tin plate. In steel the domestic producer has an advantage, as it has been possible lately to export sheet bars to Great Britain. In favor of selling tin plates at home, to replace rebate plates, rather than selling sheet bars abroad, are these considerations: The double freight on sheet bars is saved, also the 1 per cent. duty which the government retains, and the disadvantage to the buyer of rebate plates of doing business at long range with Welsh makers—besides a number of minor reasons.

It will be observed from the table already given that the imports of Welsh tin plate for strictly domestic consumption are negligible. In the past six fiscal years, 1905 to 1910 inclusive, the net excess of imports over tin plate upon which drawback was allowed averaged only 8,000,000 lb. a year. A part of this probably represented waste upon which an allowance could not be secured, the remainder being fancy charcoal bright and roofing plates, probably imported chiefly at out-of-the-way places. Even the whole 8,000,000 lb. would represent only one-half of 1 per cent. of our present production, and there is not the slightest prospect of any increase in the strictly domestic consumption of Welsh tin plate.

Insuring the Important Man

The importance of one man in some manufacturing plants is instanced by the growing custom of insuring the life of such an individual in favor of the company, so that in case of his death the loss may be made up in part by a large cash benefit. While it is true that no man is so essential to a business that his loss will be

permanently as well as seriously felt, yet occasionally an establishment is built about a genius whose removal would be a serious blow to the industrial organization. Granting that his niche would be filled acceptably by another in due course of time, a period must ensue during which his absence might mean less earnings. The insurance policy safeguards the company's resources during this time. Stockholders feel that their interests are protected, and the insurance may have its effects upon credits. The custom has prevailed for years in some large commercial institutions, but in manufacturing lines it has been less common.

Correspondence

Shortening the Working Day

To the Editor: The last three paragraphs of your article in this week's issue headed "Shortening the Working Day" should be put in the hands of every wage earner in the land; certainly howlers for a shorter day for work are debarred from complaining of increased cost of living. But this demand for a shorter day is largely due to the same well meant agitation by some publications to which you refer in your article on "Stimulating Workmen's Ambitions." There are a host of economic and sociological mollycoddles abroad in the land, and they are an extremely valuable asset to the ignorant labor agitator for shorter hours of work. These two classes are aided by the yellow press, of course. Their editors seem to be too well educated to believe in the doctrines they preach.

SHORTENING OF HOURS NOT THE WORST EVIL.

But according to the report of President Briggs of the National Founders' Association it would seem that the shortening of hours is not in itself the worst evil which manufacturers find themselves up against; it is the fact that the output per capita has declined in greater ratio than the percentage of decreased hours warrants; in short meter, the efficiency of wage earners has decreased out of proportion to the shortening of hours; and this is a very grave symptom to any one capable of recognizing what it portends. It is of much greater influence in raising cost of living than is the shortening of hours; it would not be were the output per capita to be decreased only pro rata as the hours of labor were shortened.

If we can locate the cause of this drop in the efficiency of labor it follows that we can locate, at least measurably, the cause of something which is responsible for increased cost of living to a greater degree than is the shortened hours of labor. My experience and observation lead me to the conclusion that in the last solution it is due to the employer. He (or it, if a corporation) is supposedly the most intelligent man around the factory, and if an ignorant superintendent or foreman is employed it is a fair inference that he or they are reflexes of their employer. For instance, the foreman of whom mention is made in your article "Stimulating Workmen's Ambition" could not possibly carry out so ignorant a policy were his superiors possessed of any higher grade of intelligence than his; or, if they have a higher grade of intelligence, they are lacking in a sense of their responsibility—are very careless at the best. And their men are aware of that, even if the employers are not. In such a shop the efficiency would surely be low.

IGNORANT MANAGEMENT BREEDS INEFFICIENCY.

I have been in open shop foundries running on 50 hours per week schedule and the output per capita was much lower per day than was the case in closed shop foundries where the schedule observed was 54 hours per week—that is to say, higher efficiency with shorter hours in a closed shop than longer hours in an open shop. Of course, it was a case of ignorant management, but that kind of management was epidemic in that part of the

country in respect of foundries at that time (1906). The price of castings was very much higher than the increased freight rate warranted (due to distance from furnaces, &c.). And from what I hear foundry management has not improved very much in that part of the country since then.

Taking another line of work. I have been in car shops where the output per day on a given job, for instance, turning off Pullman car wheels, was four pairs per day, and I have been in car shops where the output per day on the same kind of work was seven pairs. As the nine-hour day ruled in each case the difference in output was not caused by a difference in hours. The lathe in neither case was modern, hence the difference in output could not be charged up to that. I am satisfied that it was due to ignorant management. Perhaps this is the kind of management to which H. R. Towne had reference when testifying before the Interstate Commerce Commission. It will be remembered that he said railroad shop management was far behind the times. Be this as it may, it is this kind of management which premiumizes inefficiency; hence raises unduly the cost of living.

EFFICIENT MANAGEMENT BY MANUFACTURERS AND RAILROADS.

Governor-elect Wilson made a remark to the effect that the tariff plank in the last Republican platform premiumized, in effect, inefficiency; to do that is an economic crime, and carries its own punishment. The elections on November 8 carried an installment on account of punishment, and during the next two years or so we will feel the effects thereof. It is a safe guess that the next Republican platform, while maintaining the protective principle, will not guarantee manufacturers a duty which equalizes differences in cost of production plus a fair profit. They will have to look to "efficient management" for profit, and efficient management will increase the output per capita; hence decrease, at least to some extent, cost of living.

If Mr. Towne is right in his judgment of railroad shop management it follows that to let the railroads raise rates instead of forcing them to revise their methods, would be an economic error of the gravest sort. As a writer in the *Evening Sun* says, to raise the rates would only provoke new demands for increased pay on the part of the men, and where would it all end? Of course, it is easier to raise rates (if you can) than buckle down to the wearisome job of reducing costs, but that is what manufacturers have to do, then why exempt the railroads? And why do not the gentlemen of the Railway Business Association get the facts from Mr. Towne before indorsing the railroads' request for higher rates? Are they willing to take the responsibility for "premiumizing inefficiency," or is their attitude a case of "acceleration"?

No one with whom I have spoken among shippers objects to a raise in rates for personal reasons; they see the underlying fallacy and fear its ultimate effect. If railroads increase the efficiency of their shop management and are still shy of income no shipper will object. In that event the raise will be granted for sound economic reasons; but, in the meantime, the shippers have been fairly specific in respect of their criticisms, while railroads have confined themselves to generalities. For instance, no one undertook to question Mr. Emerson's statement in regard to his achievements on the Santa Fe; nor was the reason why the other roads did not follow the Santa Fe methods explained. If Mr. Emerson's statements are facts, the railroads are "in wrong," both from a political as well as from an economic standpoint; it follows that they should either demolish his statement or withdraw their application for leave to raise the rates.

HOW TO LOWER THE COST OF LIVING.

The *Sun* has intimated that an era of readjustment is about due; that the first step is a lowering of wages. I think that the cost of living has got to be reduced by increased output, among other ways; and if for no other reason than that we no longer have an exportable surplus of breadstuffs; hence our obligations abroad have got to be squared by exports of manufactured articles. This

means that an era of really economical—i. e., efficient—management in all lines is an imperative necessity all around. The process of adjusting ourselves to changes which these conditions will enforce is not a very comfortable one. J. J. Hill cannot be charged with not having warned us. The reduced output per acre shows that the drop in efficiency has also reached our farmers. Efficiency has got to be raised, not prices. And, as you say, this is no time to talk of shortening the hours of labor.

MAX H. C. BROMBACHER.

NEW YORK, November 26, 1910.

Foreign and Domestic Prices of Tin Plate

The *Bulletin* of the American Iron and Steel Association contains the following relative to the prices paid for tin plates in the United States, when Welsh sources were depended upon entirely and the prices that have prevailed under domestic establishment of the tin plate industry.

We give below a table which shows the actual prices paid at New York by a large consumer for foreign coke tin plates, No. 30 gauge, freight and duty paid, from October 27, 1888, to June 22, 1891. The McKinley bill, increasing the duty on tin plates, became a law on October 6, 1890, but the tin plate provision did not become operative until July 1, 1891. The table, therefore, covers a period of almost three years before this provision took effect. It was furnished to the American Iron and Steel Association several years ago by the consumer:

Price per		Price per	
No. box of		No. box of	
Date.	boxes, 112 lb.	Date.	boxes, 112 lb.
October 27, 1888.....	535 \$5.66	November 18.....	195 \$5.54
November 5.....	257 5.64	November 19.....	190 6.07
December 13.....	823 5.56	November 20.....	195 5.84
January 3, 1889.....	509 5.57	November 28.....	195 5.79
January 14.....	300 5.57	December 2.....	195 5.79
May 21.....	216 4.97	December 26.....	196 6.08
May 21.....	324 4.99	December 29.....	196 6.09
June 3.....	260 4.98	January 14, 1891.....	195 5.34
August 27.....	864 5.46	January 27.....	195 5.54
August 27.....	495 5.41	January 28.....	195 5.32
October 2.....	400 5.40	February 3.....	390 5.40
January 2, 1890.....	190 5.43	February 3.....	195 5.53
January 9.....	190 5.43	February 16.....	390 5.53
February 17.....	570 5.51	March 14.....	390 5.90
February 24.....	570 5.62	March 28.....	390 5.88
June 23.....	195 5.89	April 6.....	195 5.91
June 30.....	585 5.93	April 27.....	195 5.94
July 3.....	585 6.00	May 11.....	390 6.00
July 12.....	390 6.00	June 1.....	390 5.95
October 13.....	195 6.21	June 1.....	195 5.97
October 27.....	585 5.54	June 22.....	390 5.70

The average cost of tin plates in the 32 months covered by the above table was \$5.67 per box. The price, however, it will be noticed, often ranged above \$6 per box. The following table gives the average yearly prices of domestic tin plates, IC, 14 x 20, per box of 100 lb., at tin plate mills in Pennsylvania, from 1899 to the end of 1909:

Price.	Price.	Price.
1899.....\$4.06	1903.....\$3.74	1907.....\$3.90
1900.....4.47	1904.....3.41	1908.....3.70
1901.....4.00	1905.....3.50	1909.....3.50
1902.....3.93	1906.....3.69	

The average annual price of tin plates of domestic manufacture in these 11 years was \$3.81 per box. In recent years tin plates have been imported chiefly by the oil and canning interests to obtain the benefit of the drawback.

Howell C. Rockhill, trustee of the Fort Wayne Rolling Mills, Fort Wayne, Ind., states that the last of a debt of \$375,000 was to be paid off December 1 and the property would then revert to the original stockholders. The company became involved in 1905 and the creditors put it in the hands of a trustee. A holding company was organized to take over and operate the plant.

The Population of New York State

New York State has a population of 9,113,279, according to statistics of the 13th census just made public. This is an increase of 1,844,385, or 25.4 per cent. over that of 1900. The increase from 1890 to 1900 was 1,265,257, or 21.1 per cent. The New York *World* makes the following striking comparisons:

"The State of New York, with 9,113,279 inhabitants under the new census, has more people than any one of these European kingdoms: Belgium, Holland, Portugal, Denmark, Norway, Sweden, Bulgaria, Servia, Roumania, Montenegro, Bavaria, Saxony or Württemberg. It has as many as Scotland and Ireland combined. It has twice as many as Australia, and it exceeds all Canada by at least one-third. Its population is the same as England's at the first census of that country, taken in 1801, and two and one-third times greater than that of the entire United States at our own first census, taken in 1790. New York State is more populous than any country in South America except Brazil, and it exceeds any other country in North America except Mexico. Its increase of 1,844,385 for the last decade is greater than the population of any State west of the Missouri except California, and is almost exactly equal to that of Maine and Connecticut combined. But what is still more interesting, the population of New York City exceeds by more than 400,000 the population of the rest of the State."

The American Society for Testing Materials

Circular No. 53 of the American Society for Testing Materials announces the adoption of the specifications submitted to the members some months ago on staybolt iron on yellow pine bridge and trestle timbers and on methods of testing. The annual volume of the *Proceedings*, which will contain about 650 pages, will be distributed in December. Notwithstanding the increase in dues from \$5 to \$10 a year, only 40 resignations have been received, but in the same time 137 new applications have come in, so that the present membership is 1303. The American membership in the International Association is growing, being now 438, Germany being next to this country with about 400 members. A further large increase in the American membership is expected before the next International Congress, which will be held in New York in the fall of 1912, Prof. Henry M. Howe presiding. Among papers now being arranged for that meeting will be one by James E. Howard, Bureau of Standards, Washington, on "The Effects of Temperature on the Strength of Structural Materials."

Against Further Tariff Revision.—James M. Swank, vice-president and general manager of the American Iron and Steel Association, has addressed a letter to President Taft giving reasons against further tariff agitation. The letter concludes with the following: "We respectfully submit that no good reason exists for a further revision of the tariff or any part of it at the present time or at any time in the immediate future, and that it would be unwise to recommend that this revision be made. If recommended and undertaken the country's industrial conditions, which have been subjected during the past three years to a great strain, would be still further depressed, and the capitalists who provide employment for workingmen would have their anxiety still further increased. We respectfully suggest that nothing be done to increase the general discontent, but that everything possible be done to allay apprehension, especially in business circles. Stability is greatly needed and not continual agitation. The country wants industrial, financial and political peace."

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	Nov. 30, 1910.	Nov. 23, 1910.	Oct. 26, 1910.	Nov. 24, 1909.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	\$15.50	\$15.50	\$15.75	\$19.00
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	17.75
Foundry No. 2, local, Chicago ..	16.00	16.00	16.00	19.00
Basic, delivered, eastern Pa.	14.75	14.75	15.00	18.75
Basic, Valley furnace	13.50	13.50	13.00	17.25
Bessemer, Pittsburgh	15.90	15.90	15.90	19.90
Gray forge, Pittsburgh	13.90	13.90	14.15	17.40
Lake Superior charcoal, Chicago	18.00	18.00	18.00	19.50

BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh ..	23.00	23.00	23.50	27.50
Forging billets, Pittsburgh ..	28.50	28.50	29.00	31.00
Open hearth billets, Philadelphia	25.50	25.50	26.00	30.60
Wire rods, Pittsburgh	28.00	28.00	28.50	33.00

OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago	16.00	16.00	16.00	19.50
Iron rails, Philadelphia	18.00	18.00	18.00	21.00
Car wheels, Chicago	13.50	13.50	14.00	18.50
Car wheels, Philadelphia	13.75	13.75	13.75	17.50
Heavy steel scrap, Pittsburgh ..	14.25	14.25	14.25	17.50
Heavy steel scrap, Chicago	12.25	12.25	12.25	16.00
Heavy steel scrap, Philadelphia	13.00	13.50	13.75	18.00

FINISHED IRON AND STEEL, Per Pound:				
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia ..	1.35	1.37	1.40	1.65
Common iron bars, Chicago	1.35	1.35	1.35	1.60
Common iron bars, Pittsburgh ..	1.40	1.40	1.45	1.70
Steel bars, tidewater, New York	1.56	1.56	1.56	1.66
Steel bars, Pittsburgh	1.40	1.40	1.40	1.50
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh	1.40	1.40	1.40	1.55
Beams, tidewater, New York ..	1.56	1.56	1.56	1.71
Beams, Pittsburgh	1.40	1.40	1.40	1.55
Angles, tidewater, New York ..	1.56	1.56	1.56	1.71
Angles, Pittsburgh	1.40	1.40	1.40	1.55
Skelp, grooved steel, Pittsburgh ..	1.25	1.25	1.30	1.55
Skelp, sheared steel, Pittsburgh ..	1.30	1.30	1.40	1.60

SHEETS, NAILS AND WIRE, Per Pound:				
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.30
Wire nails, Pittsburgh	1.70	1.70	1.70	1.80
Cut nails, Pittsburgh	1.60	1.60	1.65	1.80
Barb wire, galv., Pittsburgh ..	2.00	2.00	2.00	2.10

METALS, Per Pound:				
Lake copper, New York	13.00	13.00	12.87½	14.00
Electrolytic copper, New York ..	12.87½	12.87½	12.80	13.75
Spelter, New York	5.95	5.95	5.60	6.40
Spelter, St. Louis	5.80	5.80	5.45	6.25
Lead, New York	4.50	4.50	4.40	4.40
Lead, St. Louis	4.40	4.40	4.27½	4.27½
Tin, New York	37.35	36.90	36.15	31.30
Antimony, Hallett, New York ..	7.75	7.75	7.75	8.25
Tin plate, 100-lb., box, New York	\$3.84	\$3.84	\$3.84	\$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.40c. to 1.45c., net; tees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1,

1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	\$0.10
Gauges under 3-16-in. to and including No. 8 .....	.15
Gauges under No. 8 to and including No. 9 .....	.25
Gauges under No. 9 to and including No. 10 .....	.30
Gauges under No. 10 to and including No. 12 .....	.40
Sketches (including all straight taper plates), 3 ft. and over in length .....	.10
Complete circles, 3 ft. in diameter and over .....	.20
Boiler and flange steel .....	.10
"A. B. M. A." and ordinary firebox steel .....	.20
Still bottom steel .....	.30
Marine steel .....	.40
Locomotive firebox steel .....	.50
Widths over 100 in. up to 110 in., inclusive .....	.05
Widths over 110 in. up to 115 in., inclusive .....	.10
Widths over 115 in. up to 120 in., inclusive .....	.15
Widths over 120 in. up to 125 in., inclusive .....	.25
Widths over 125 in. up to 130 in., inclusive .....	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive .....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive .....	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, 1.60c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets: Nos. 10 and 11, 1.85c.; Nos. 12 to 14, 1.90c.; Nos. 15, 16 and 17, 1.95c.; Nos. 18 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.15c.; Nos. 27 and 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c. Galvanized sheets, Nos. 10 and 11, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18, 19, 20 and 21, 2.60c.; No. 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, \$1.55 per square. Galvanized sheets, No. 28, \$2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		Steel.		Iron.	
	Black.	Galv.	Black.	Galv.	Black.	Galv.
¼ in.	72	58	68	54		
½ in.	75	63	71	59		
¾ to 1½ in.	79	69	75	65		
2 to 3 in.	80	70	76	66		
Lap Weld.						
2 in.	76	66	72	62		
2½ to 4 in.	78	68	74	64		
4½ to 6 in.	77	67	73	63		
7 to 12 in.	75	69	71	61		
13 to 15 in.	51½					
Butt Weld, extra strong, plain ends, card weights.						
¼ in.	69	59	65	55		
½ in.	74	68	70	64		
¾ to 1½ in.	78	72	74	68		
2 to 3 in.	79	73	75	69		
Lap Weld, extra strong, plain ends, card weight.						
2 in.	75	69	71	65		
2½ to 4 in.	77	71	73	67		
4½ to 6 in.	76	70	72	66		
7 to 8 in.	69	59	65	55		
9 to 12 in.	64	54	60	50		
Butt Weld, double extra strong, plain ends, card weight.						
¼ in.	64	58	60	54		
½ to 1½ in.	67	61	63	57		
2 to 3 in.	69	63	65	59		
Lap Weld, double extra strong, plain ends, card weight.						
2 in.	65	59	61	55		
2½ to 4 in.	67	61	63	57		
4½ to 6 in.	66	60	62	56		
7 to 8 in.	59	49	55	45		

THE IRON AND METAL MARKETS

Plugged and Reamed.
1 to 1½, 2 to 3 in. Butt Weld
2, 2½ to 4 in. Lap Weld
The above discounts are for card weight, subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1½ to 2½ in.	61	43
2½ in.	63	48
2½ to 5 in.	69	55
6 to 13 in.	61	43
2½ in. and smaller, over 18 ft., 10 per cent. net extra.		
2½ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer rods, \$28; open hearth and chain rods, \$28.50.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c.; base; cone head boiler rivets, ¾ in. and larger, 2c.; base; ¾ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, November 30, 1910.—(By Telegraph.)

Pig Iron.—The only sale of moment during the week is one of 6000 to 8000 tons of basic to a local open hearth steel plant, for first half of the year delivery, but the price paid has not been given out. In conformity with an agreement reached sometime ago, all the Valley furnaces are holding Bessemer iron at \$15 minimum for first half, and several furnaces will not sell at that price. The pig iron market is likely to be very quiet until after the first of the year, and with the heavy output and light demand, together with the large stocks piled up, prices are none too strong. We quote for delivery in first half of next year as follows: Standard Bessemer, \$15; malleable Bessemer, \$13.75 to \$14; gray forge, \$13; basic, \$13.50 to \$13.75, and No. 2 foundry, \$14, all at Valley furnace, the freight to Pittsburgh being 90c. a ton.

Steel.—A sale is reported of 1500 tons of Bessemer sheet bars for prompt delivery at \$24.50, Pittsburgh, freight to destination added. New inquiry for steel is very light, and the market is heavy. Some of the smaller steel mills are said to be slightly shading prices quoted by the larger interests on both billets and sheet bars. We quote Bessemer and open hearth billets, 4 x 4 in. and up to but not including 10 x 10 in., at \$23, base, and sheet and tin bars in 30-ft. lengths, \$24.50, f.o.b. Pittsburgh, full freight to destination added.

(By Mail.)

The two items of interest in the iron trade this week are the placing by the Pennsylvania Railroad of contracts for 1911 delivery for 150,000 tons of steel rails, divided among the usual mills, and by the New York Central Railroad an order for something over 200 locomotives with the American Locomotive Company. The latter was the remainder of a contract for 323 locomotives placed early in the year, but deliveries on which were held up after 100 or more of the locomotives had been built. Otherwise the week has been quiet, and the impression prevails that December will probably be a dull month. It is believed, however, that shortly after the first of the year the demand will materially improve. It is estimated that the leading steel mills are operating only to about 60 to 65 per cent. of capacity, and this rate of operation may be lessened during the month. In spite of the lack of new demand prices generally are no lower, although here and there concessions from regular quotations are being quietly made. The efforts of a number of the leading coke producers to form a central selling agency have about been given up, but it is said that another plan is under way which, it is hoped, may lift the coke trade out of the slough of despond in which it seems to have fallen. The scrap trade is quiet and prices are only fairly steady.

Ferromanganese.—A leading consumer in the Shenango

Valley has closed for about 800 tons of 80 per cent. foreign for delivery through 1911, on the basis of about \$38.50, Baltimore. Leading consumers are now pretty well covered for first half, and in some cases through all of next year. We quote 80 per cent. foreign for delivery through 1911 at \$38.50 to \$38.75, Baltimore, the freight rate for delivery in the Pittsburgh district being \$1.95 a ton.

Ferrosilicon.—A local consumer is reported to have bought about 100 tons for first half on the basis of about \$55 f.o.b., Pittsburgh. There is still a scarcity of ferrosilicon for prompt shipment, but it does not strengthen prices. We quote 50 per cent. for delivery over the first six months of next year at \$55 to \$55.50, and for prompt delivery at \$56 to \$56.50. We quote 10 per cent. blast furnace silicon at \$23; 11 per cent., \$24; 12 per cent., \$25, f.o.b. cars, Jisco and Ashland furnaces.

Skelp.—Inquiries are rather light. The pipe mills are getting ready to take inventory and close the year's business and will not take in any more material in December than is absolutely necessary. Consumers are pretty well covered through the first quarter of next year, and the mills rolling skelp thus have a fair amount of work ahead. We quote grooved steel skelp, 1.25c. to 1.30c.; sheared steel skelp, 1.30c. to 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Rods.—A sale has been made of 500 tons of Bessemer rods at \$28.70, delivered, Pittsburgh, netting about \$28.25, f.o.b. at mill. Specifications against contracts are not coming in very freely, and new inquiry is light, being confined mostly to small lots for actual needs. We continue to quote Bessemer rods at \$28 to \$28.50, and open hearth and chain rods, \$28.50, Pittsburgh.

Muck Bar.—Consumers are pretty well covered, and the few makers of muck bar for the open market have their product well sold up through the first quarter. No inquiries are reported. Best grades of rolled muck bar made from pig iron are held at about \$29.50 to \$30, delivered buyer's mill, Pittsburgh, while Eastern muck bar is being offered at \$28.50 to \$29, delivered in this district.

Steel Rails.—The Pennsylvania Railroad contract for 150,000 tons of steel rails for delivery next year has already been referred to. It is probable that several other prominent roads will shortly make contracts for 1911 delivery. The Carnegie Steel Company had a very good week in light rails, orders entered and specifications received against contracts having been heavier than in any one week for several months. Quotations on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. These prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. We quote standard sections at 1.25c. per pound.

Plates.—The Carolina, Clinchfield & Ohio Railroad has placed contracts for 1000 50-ton steel hopper cars, divided among three steel car companies; the Boston Elevated has placed 50 cars with the Laconia Car Company, and the New York Despatch Refrigerator Line has ordered 300 30-ton cars from the Whipple Car Company. It is stated that the Buffalo, Rochester & Pittsburgh Railroad will soon be in the market for 1500 to 2000 freight cars, 15 to 20 passenger cars and 10 to 15 engines. The giving out of these contracts and the prospects of additional work have enlivened the plate trade to some extent. The general demand for plates is also slightly better than for some time, specifications against contracts coming in more satisfactorily. We quote ¼ in. and heavier plates in the wider sizes at 1.40c., Pittsburgh, but on the narrow sizes two or three mills are naming 1.35c., Pittsburgh, on attractive orders.

Structural Material.—Inquiries for bridge work from the railroads is more active, the Norfolk & Western, the Great Northern and several other roads having inquiries out for a considerable tonnage. The new office building of the Republic Iron & Steel Company at Youngstown will likely be placed at an early date and will take about 1000 tons. The McClintic-Marshall Construction Company has taken 300 tons for the Nineteenth Ward school building in this city, and about 150 tons for a new building for the Fairmount Mining Machinery Company, Fairmount, W. Va., covering foundations and superstructure. The McClintic-Marshall Company is going more and more into the business of taking contracts for the complete erection of buildings, including foundations. The Jones & Laughlin Steel Company has taken about 1500 tons for an extension to a hotel in an Eastern city. We continue to quote beams and channels up to 15-in. at 1.40c., f.o.b. Pittsburgh.

Sheets.—Several of the independent mills report they are pretty well filled up for the next three months, but the actual amount of new business being placed is only fair. There is still some shading in prices on black sheets, but not so much on galvanized, the high price ruling for spelter

THE IRON AND METAL MARKETS

having a stiffening effect. For exceptionally attractive orders 2.10c. on No. 28 black sheets is sometimes being accepted. The general market on sheets is on the basis of 2.20c. for No. 28 one pass black sheets and 3.20c. for No. 28 galvanized. The full schedule of prices in effect on black and galvanized and on roofing sheets is given on a previous page.

Tin Plate.—Fairly heavy contracts for bright plate from salmon packers, meat packers and can makers have been placed in the past two or three weeks, some being for first quarter and some running through first half. There has thus been a decided betterment in conditions, and quite a number of hot mills that were shut down in the early part of November have been started up. The Demmler Works of the American Sheet & Tin Plate Company have been put on full time. It is stated that 10 more hot mills are to be added to the Shenango Works of the same company at New Castle, Pa., which will make a total of 40 hot mills in the plant. The market is reported as being very firm, and we continue to quote 100 lb. cokes at \$3.60 per base box, f.o.b. Pittsburgh.

Bars.—A slightly better demand for iron bars from railroads is reported, while specifications against contracts for steel bars are coming in at a fairly satisfactory rate. It is probable that shipments by the mills in December will show a falling off as compared with November, consumers probably taking in as little material as possible before taking inventory and closing up the year's business. We quote steel bars at 1.40c. and common bars at 1.40c. to 1.45c., f.o.b., Pittsburgh.

Hoops and Bands.—Several fairly large contracts for both hoops and bands for delivery in first quarter and first half of next year have recently been closed. Specifications against contracts are not coming in as freely as some time ago. We quote hoops at 1.50c. in large lots, and 1.55c. in small lots; bands, 1.40c. in carload and larger lots, and 1.45c. in small lots, the latter carrying extras as given in the steel bar card dated September 1, 1909.

Cotton Ties.—The price of cotton ties for December delivery is 78c. per bundle, but contracts have been pretty well gathered in and only a few scattering orders are being placed.

Spikes.—The inquiry for spikes is only fair, the demand being confined mostly to small lots for repair work. It is stated that some large tonnages for spikes are coming up for railroads running west of Chicago, but most of this business will go to the Chicago makers. We quote standard sizes of railroad spikes at 1.50c. to 1.55c. for Western shipment and 1.55c. to 1.60c. for local trade. We quote small railroad and boat spikes at 1.60c. to 1.65c., base, in carload and larger lots.

Rivets.—The new demand for rivets is reported as more active than for some time, and specifications against contracts are also referred to as being received at a more satisfactory rate. It is stated that regular prices, which are 1.90c. for structural and 2c. for boiler rivets, are being absolutely maintained.

Spelter.—Inquiry is light. We quote prime grades of Western spelter at 5.90c., East St. Louis, equal to 6.02½c., Pittsburgh.

Merchant Steel.—The tonnage shipped out by the mills in November is stated to have been only slightly less than October. One leading maker reports that specifications against contracts in the last half of November were much better than in the first half. We quote, f.o.b. Pittsburgh: Iron finished tire, 1½ x ½ in. and heavier, 1.40c., base, under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.95c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Shafting.—Conditions in the shafting trade are quiet, specifications against contracts being light and new demand dull. The automobile builders are usually heavy consumers of shafting, but they have been taking in very little for some time. It is stated that regular discounts are being fairly well maintained, and are 55 per cent. off in carload and larger lots, and 50 per cent. off in small lots, delivered in base territory. On desirable contracts and for large lots 55 and 5 per cent. is being named.

Wire Products.—New orders for wire nails and wire are only fair and are for small lots to cover actual needs, while specifications against contracts are coming in only at a moderate rate. December is expected to be a dull month in the wire trade, but a material betterment is expected early in January. We quote galvanized barb wire at \$2; painted, \$1.70; annealed fence wire, \$1.50; galvanized, \$1.80; wire nails, \$1.70, and cut nails, \$1.30, in carload and larger lots, all f.o.b. Pittsburgh, freight to destination being added.

Merchant Pipe.—This is always the dull season in the pipe trade. The demand has quieted down considerably,

while shipments from the mills in December will probably show a falling off as compared with November. A report is out that the Busch-Everett syndicate, which proposes to build a line to pipe gas from Shreveport, La., to St. Louis, has been dissolved, and that the project has fallen through. This report, however, has not been confirmed. Regular discounts on iron and steel pipe, printed on a previous page, are said to be well maintained.

Boiler Tubes.—The demand for merchant tubes continues very dull. Prices on both iron and steel boiler tubes are more or less irregular, and some sales are said to have been made below cost.

Iron and Steel Scrap.—Consumers of scrap will take as little material in December as possible, owing to inventory period being near at hand, and hence trade during this month will likely be quiet. No sales of importance have transpired. Dealers quote about as follows, per gross ton, f.o.b. Pittsburgh or elsewhere, as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.....	\$14.25 to \$14.50
No. 1 foundry cast.....	13.50 to 13.75
No. 2 foundry cast.....	13.00 to 13.25
Bundled sheet scrap, at point of shipment.....	9.00 to 9.50
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	16.25 to 16.50
No. 1 railroad malleable stock.....	13.00 to 13.25
Grate bars.....	11.25 to 11.50
Low phosphorus melting stock.....	17.25 to 17.50
Iron car axles.....	24.00 to 24.50
Steel car axles.....	20.25 to 20.50
Locomotive axles.....	24.50 to 25.00
No. 1 busheling scrap.....	12.25 to 12.50
No. 2 busheling scrap.....	8.75 to 9.00
Old car wheels.....	13.75 to 14.00
Sheet bar crop ends.....	15.75 to 16.00
Cast iron borings.....	8.00 to 8.25
Machine shop turnings.....	8.75 to 9.00
Old iron rails.....	16.00 to 16.25
No. 1 wrought scrap.....	14.50 to 14.75
Stove plate.....	11.50 to 11.75
Heavy steel axle turnings.....	10.25 to 10.50

Coke.—The project of leading independent coke operators to form a central selling agency, in an effort to put the coke business on a more profitable basis, is reported to have been abandoned. It is stated that another plan is under consideration. The Youngstown Sheet & Tube Company last week contracted with the Estate of W. J. Rainey for a large supply of furnace coke running through all of 1911 at a flat price. The minimum amount involved is 20,000 tons and the maximum 35,000 tons per month. An Eastern blast furnace interest, which has heretofore used Mountain coke, is also reported to have closed for a large tonnage of Connellsville coke for delivery over first half. We continue to quote standard makes of furnace coke for prompt shipment at \$1.45 to \$1.50 per net ton at oven, while for delivery over first half \$1.75 to \$1.80 is quoted. Best makes of 72-hour foundry coke for prompt shipment are held at about \$2 per net ton at oven, and for first half from \$2.10 up to \$2.50. The output in the Upper and Lower Connellsville regions last week was 326,056 net tons, a decrease over the previous week of about 1800 tons.

The offices of Goff, Horner & Co., Ltd., iron and steel factors and district sales agents for the American Rolling Mill Company, Middletown, Ohio, have been removed from the Frick Building to the eighteenth floor of the Henry W. Oliver Building, Smithfield street, Pittsburgh.

The offices of the Pittsburgh Shovel Company works at Leechburg, Pa., have been removed from the Frick Building to the eighteenth floor of the Henry W. Oliver Building, Pittsburgh.

Chicago

FISHER BUILDING, November 30, 1910.—(By Telegraph.)

While prices of finished materials continue firm the amount of new business that is being taken by the steel mills does not account wholly for their confidence. Railroads are now willing to contract for bar iron through the first half of 1911 at present prices; but, while their willingness to purchase for extended delivery is encouraging, the mills are not disposed to commit themselves so far ahead at prices which return little or no profit. The growing car shortage has not yet stimulated any extensive car purchases. The structural steel manufacturers and fabricating interests are encouraged by the fact that financial conditions are becoming more favorable for new building projects. The tonnage represented by new buildings in Chicago, on which work will begin next spring, is larger than for some years past, and in all the Western cities plans are under way for steel buildings. During the past year the fabricating interests in this territory have felt severely the competition of concrete construction. The general merchant bar trade is quiet. The wire mills are getting more business than a

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week ago. There is a fair amount of inquiry for sheets, and store distribution is more active. The larger buyers, however, are disposed to await developments.

Pig Iron.—The month of November has developed a fair buying movement for Southern iron, and sales by Southern furnaces through Chicago offices for deliveries in this territory have amounted to something over 75,000 tons during the month. There have been inquiries for perhaps a larger tonnage of Northern iron the past month, but this business has not been closed. In fact, the actual sales of Northern iron during November are not estimated at more than half the amount of Southern that has been sold. Most of the sales of Southern have been for first quarter and in some cases for the full first half, while the Northern furnaces have been very reluctant to sell into next year except at an advance of about 50c. over the current price for prompt shipment. Among the sales closed last week a boiler interest at Kewanee has purchased 5000 tons, principally Southern iron, and an implement manufacturer west of Chicago has purchased 3000 tons for first half. Several lots of Virginia iron have been sold in this territory recently for first quarter delivery, and one recent transaction included 1500 tons of Valley iron, first quarter, for Chicago delivery. The Northern market is waiting for the malleable foundries, and they in turn are waiting for specifications from the railroads and manufacturers of railroad equipment. The malleable foundries have bought very little iron for the first half owing to the fact that many of them overbought for the last half of this year. The present depression in the pig iron market is largely due to the curtailment of railroad specifications for foundry work. This curtailment is estimated at more than half a million tons of iron in the United States, it being estimated that stocks of merchant iron at all furnaces have increased about half a million tons this year. Prices are apparently holding about even, with Northern iron a trifle stronger. Some Southern iron has been sold for first quarter delivery at \$11 Birmingham, but a majority of the Southern furnace interests are holding for \$11.50 for first half. The following quotations are for December shipment, Chicago delivery:

Lake Superior charcoal.....	\$18.00 to \$18.50
Northern coke foundry, No. 1.....	16.50 to 17.00
Northern coke foundry, No. 2.....	16.00 to 16.50
Northern coke foundry, No. 3.....	15.75 to 16.00
Northern Scotch, No. 1.....	17.00 to 17.50
Southern coke, No. 1.....	15.85 to 16.35
Southern coke, No. 2.....	15.35 to 15.85
Southern coke, No. 3.....	15.10 to 15.60
Southern coke, No. 4.....	14.85 to 15.35
Southern coke, No. 1 soft.....	15.85 to 16.35
Southern coke, No. 2 soft.....	15.35 to 15.85
Southern gray forge.....	14.60 to 15.10
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	16.00 to 16.50
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%..	19.40 to 19.90
Jackson Co. and Kentucky silvery, 8%..	20.40 to 20.90
Jackson Co. and Kentucky silvery, 10%.	21.40 to 21.90

(By Mail.)

Billets.—Open hearth forging billets are quoted at \$25, base, Chicago, for current lots.

Rails and Track Supplies.—Orders taken by the Illinois Steel Company last week amounted to about 8000 tons of standard rails. There have been several inquiries from Western roads for small lots, which are apparently intended as preliminary orders to delay the issue of contracting for a year's requirements. Sales of light sections this year have amounted to about the average tonnage for this class of rails. Track supplies are weaker and are quoted lower. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.20c. to 2.30c., base, all in carload lots, Chicago. Light rails 40 to 45 lb., 1.16c. to 1.20 $\frac{1}{2}$ c.; 30 to 35 lb., 1.19 $\frac{1}{2}$ c. to 1.24c.; 18, 20 and 25 lb., 1.20 $\frac{1}{2}$ c. to 1.25c.; 12-lb., 1.25c. to 1.29 $\frac{1}{2}$ c., Chicago.

Structural Material.—While current bookings are light the fabricating interests are encouraged by the enormous amount of building tonnage in prospect throughout the West. In Chicago alone work will commence during the next six months on several large buildings which will require 40,000 to 50,000 tons, including 10,000 tons contracted by Mandel Brothers last winter, on which work will commence next spring. Financial arrangements are reported to have been finally closed on a project that has been pending a long time for an office building to occupy the block west of the Board of Trade. This will be known as the Underwriters' Building and will require at least 12,000 tons. Other important buildings that are in prospect are backed by strong estates or investing interests which are not likely to have trouble in financing their plans. In all of the growing cities of the West there are plans pending for steel office buildings, and a favorable money market will bring out a very large amount of this business. The U. S. Gypsum Company has let to the Indiana Bridge Company, Muncie, Ind., contracts for 680 tons for two factories, at Alabastine, Mich., and Rochester, N. Y. The American Bridge Company took the Hoge Building, Seattle, Wash.,

1750 tons. The Brown-Ketchum Iron Works, Indianapolis, Ind., was the successful bidder for a 750-ton building for the Anheuser-Busch brewery at St. Louis. The Wisconsin Bridge Company booked 450 tons of bridge work for the Duluth, Winnipeg & Pacific Railroad. A warehouse for the McMurtrie Mfg. Company at Denver, 100 tons, went to the Lowth Brothers Iron Works Company of that city. The Trostel tannery at Milwaukee, 70 tons, was let to Scobis Brothers of that city. The market for plain material is firm and the mills are getting more specifications from miscellaneous sources. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—One of the encouraging features in the market is that the plate mills are maintaining prices. The going business is well distributed now, and the mill interests undoubtedly expect a larger demand in the near future from car shops and fabricating interests. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—The market is holding steady, especially on open hearth sheets, although the current demand is less than the full capacity of the mills. Based on the price of 3.20c., Pittsburgh, for No. 28 galvanized, in carload lots to jobbers, the differentials ruling in the Chicago market are as follows: No. 30, 3.68c.; No. 29, 3.48c.; No. 28, 3.38c.; No. 27, 3.23c.; Nos. 25 and 26, 3.08c.; Nos. 23 and 24, 2.88c.; Nos. 18 to 22, 2.78c.; Nos. 15 to 17, 2.63c.; Nos. 12 to 14, 2.48c.; Nos. 10 and 11, 2.38c. The differentials on black sheets remain unchanged. No. 10 blue annealed sheets are quoted at 1.83c., Chicago, and No. 28 black, 2.38c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—The railroads are slowly increasing their specifications for bar iron, but current business is still considerably short of the capacity of the mills, and prices for this product are very close to cost. The weakness in the price of rerolling rails encourages close prices on inquiries for hard steel bars. Specifications for soft steel bars are now coming in at a rate which keeps the price firm. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.35c. to 1.40c.; hard steel bars rolled from old rails, 1.45c. to 1.50c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Rods and Wire.—It was noted last week that there had been a considerable drop in specifications for wire products. This appears now to have been a temporary lull rather than the end of the season, as new orders and specifications have picked up again. The mills will soon begin taking contracts from manufacturing interests for the full first half, where such contracts are necessary. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.88c.; painted barb wire, 1.88c.; galvanized, 2.18c., all Chicago.

Merchant Steel.—Specifications continue at a normal rate from the agricultural trade, the gain in the volume of business from this source being sufficient to overcome the drop in the requirements of the automobile trade for special grades of steel.

Cast Iron Pipe.—The only letting of any moment that is pending this week is one of 900 tons at Harbor Springs, Mich. Municipalities have not begun to advertise to any extent their specifications for next year, but developments in this line are expected during December. A favorable indication for the pipe trade during the coming year is that money is growing easier and the market for railroad bonds has improved. Cities have been hampered by difficulty in selling their bonds. In many States the law forbids issuing municipal bonds at a discount and 4 per cent. bonds cannot be sold at par. A favorable bond market this winter will bring out a large amount of pipe business. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., \$27; 6 to 12 in., \$26; 16-in. and up, \$25, with \$1 extra for gas pipe.

Old Material.—The influence of railroad buying begins to appear in the scrap market in a little better demand from foundries for railroad malleable scrap, as from steel foundries for steel couplers and knuckles. The railroads have placed a good many contracts with malleable foundries with a cancellation clause contingent upon getting their advance in rates. This places the foundry in an unhappy position, as it has given an option on its product without knowing whether to buy pig iron and scrap to cover the tonnage. The present demand for malleable scrap apparently grows out of small orders given by the railroads for prompt shipment. Other grades of scrap are holding about even, except that rerolling rails are easier. Small lots have been sold recently at sacrifice concessions below \$15, bringing them back to the old differential of \$1.50 above heavy melting steel. The mills continue to take all the melting steel that comes along, paying about the same price that they have paid for the last six months, which allows the

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dealer about \$12.50 per gross ton, delivered. Foundries are taking all the cast scrap offered them at present prices, as they can mix it with Northern iron and make the cheapest foundry mixture that the gray iron foundries have had in this territory in the last six years. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to \$1 less in this district, owing to high switching charges. Following prices are per gross ton, delivered, Chicago:

Old iron rails.....	\$16.00 to \$16.50
Old steel rails, rerolling.....	15.00 to 15.50
Old steel rails, less than 3 ft.....	13.50 to 14.00
Relaying rails, standard sections, subject to inspection.....	24.00 to 25.00
Old car wheels.....	13.50 to 14.00
Heavy melting steel scrap.....	12.25 to 12.75
Frogs, switches and guards, cut apart.....	12.25 to 12.75
Shoveling steel.....	11.75 to 12.25

The following quotations are per net ton:

Iron angles and splice bars.....	\$14.00 to \$14.50
Iron car axles.....	19.00 to 19.50
Steel car axles.....	19.00 to 19.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	11.00 to 11.50
Springs, knuckles and couplers.....	11.75 to 12.25
Locomotive tires, smooth.....	17.00 to 17.50
No. 1 dealers' forge.....	10.50 to 11.00
Steel axle turnings.....	8.25 to 8.75
Machine shop turnings.....	7.00 to 7.50
Cast and mixed borings.....	5.00 to 5.50
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	8.00 to 8.50
No. 1 boilers, cut to sheets and rings.....	8.50 to 9.00
Boiler punchings.....	14.00 to 14.50
No. 1 cast scrap.....	12.50 to 13.00
Stove plate and light cast scrap.....	10.75 to 11.25
Railroad malleable.....	11.50 to 12.00
Agricultural malleable.....	10.50 to 11.00
Pipes and flues.....	9.00 to 9.50

Philadelphia

PHILADELPHIA, Pa., November 29, 1910.

The market for both crude and finished materials still drags. While there has been no heavy movement in pig iron sellers feel more encouraged with the situation, not that it is believed that there will be any marked buying in the immediate future, but more particularly with the fact that curtailment of production continues, if only in a moderate way. In several cases sellers have practically withdrawn from the market at the present price level, while in instances iron on the banks has been cleaned up before suspension of operations. The finished material situation remains unchanged; orders coming in are generally small, although makers of plates and shapes are more encouraged with the volume of business in sight. Billet makers report a falling off in demand. Refined iron bars are dull and show a tendency toward lower prices. The coke movement is very light. There is still little demand for old materials, and in the absence of business prices for principal grades show a lack of strength.

Iron Ore.—The market is at a standstill. Importations at this port during the week ending November 26 aggregated 24,963 tons, valued at \$111,625.

Pig Iron.—While there has been no heavy curtailment of production, the fact that some of the merchant furnaces in eastern Pennsylvania, New Jersey and Virginia have recently blown out or are about to blow out is taken as an encouraging feature. Musconetcong Furnace was blown out November 24; Princess in Virginia was blown out on the 29th, while Victoria Furnace, also in Virginia, will go out in the very near future. In the case of the Virginia furnaces, practically all the iron on the furnace banks has been sold, and these producers are now out of the market. In a few other instances producers have practically withdrawn from the market at the prevailing prices. The principal transactions in the pig iron market recently have been in low grade iron. One of the Delaware River cast iron pipe foundries has purchased practically the full tonnage against its recent inquiry for 6000 tons. This was taken in various lots, about one-half Southern and one-half Northern, among which were forge at \$10, Birmingham, and No. 3 at \$10.50. Report has it that a 1000 ton block of forge was also included at \$9.75, Birmingham. Other pipe makers have been picking up odd lots, running up to 400 tons, both Southern and Northern low grade being taken at prices varying according to the grade. The movement in the higher grades of foundry iron has been less active. Large lot buyers have temporarily withdrawn from the market, awaiting further developments. Moderate buyers are feeling around to get a line on prices, but the bulk of the sales have been under the 300-ton mark, a good share of which is for prompt delivery, although in a number of instances shipments also extend through the first quarter. The bulk of this business is done at prices ranging from \$15.50 to \$15.75, delivered in this vicinity, for standard brands of eastern Pennsylvania No. 2 X foundry, although occasional sales at \$16, delivered, are

reported. Virginia No. 2 X foundry, both for prompt as well as first quarter delivery, has been selling in carloads up to a few hundred tons at \$13, at furnace, equal to \$15.80 to \$16.05, delivered in this territory, with occasional sales at \$13.25, at furnace, and it is said that producers who were willing to dispose of iron under that basis have sold all they want and are now either out of the market or have firmed up on quotations. Very little movement in the higher grades of Southern foundry iron is reported, although one sale of 100 tons of No. 2 at \$11, Birmingham, for prompt delivery, is announced. Few sales of Northern forge iron have been made, although some inquiry is still before the trade. Prices are nominally quoted at \$14.25 to \$14.50, delivered, but it is reported that concessions might be made for desirable orders. Negotiations for basic are still under way for a moderate tonnage for first quarter delivery. Further sales of low phosphorus iron are reported both in standard grades—at prices equal to \$22.50, delivered here—and in less desirable brands. Sales of high manganese low phosphorus iron are reported at \$21.50, delivered in this vicinity, while Lebanon low phosphorus, with high copper content, has been sold in round lots for first half delivery at prices ranging from \$17 to \$17.25, delivered. The general range of quotations shows practically no change. Prices for standard brands, for prompt or first quarter shipment in buyers' yards, eastern Pennsylvania and nearby points, are named as follows:

Eastern Pennsylvania, No. 2 X foundry.....	\$15.50 to \$15.75
Eastern Pennsylvania, No. 2 plain.....	15.00 to 15.25
Virginia, No. 2 X foundry.....	15.80 to 16.25
Virginia, No. 2 plain.....	15.80 to 16.05
Gray forge.....	14.25 to 14.50
Basic.....	14.75 to 15.00
Standard low phosphorus.....	22.50

Ferromanganese.—There is practically no demand from consumers in this territory, although local sellers have disposed of small lots for Western shipment at \$38.50, Baltimore. While some sellers are firmer in quotations, the market will no doubt remain easy until speculative importations, which continue to arrive, have been cleaned up.

Billets.—Little encouragement is derived from the volume of business offered. Producers in this section, in the majority of cases, still report a small hand to mouth business, the aggregate tonnage of which is somewhat less than a few weeks ago. There is still an absence of any definite inquiry for delivery beyond the year end. Prices remain practically unchanged, ordinary basic open hearth rolling billets for prompt shipment being quoted at \$25.50 to \$26, delivered in this vicinity, dependent on the size of the order. Forging billets are a trifle more active than rolling billets and are quoted at \$28, Eastern mill, the usual extras for high carbons and special sizes being added.

Plates.—While occasional sizable orders, running up to a few hundred tons, come to the mills, the bulk of the business taken is small and largely for prompt shipment. Immediate orders show no material gain in aggregate volume, but mills, from the betterment to be noted in car, locomotive and bridge orders, look forward to a better demand. Some moderate ship plate orders are in sight, with larger tonnages for material of this character to follow. Prices are being well maintained by Eastern makers, who name 1.55c., delivered, as the minimum price for carload lots of ordinary plates delivered in this vicinity.

Structural Material.—The most important project in this district now before the trade is that of the new warehouse for the Baltimore Bargain House, which is estimated to require from 2500 to 3500 tons of structural material. Some garage work and smaller building propositions, requiring upward of 100 tons, are also being figured upon. No fresh contracts for fabricated work of any size has been placed in this vicinity, the bulk of the business being of a miscellaneous character. Prices are firm, at 1.55c. to 1.60c. for plain shapes, according to specification, delivery in this vicinity.

Sheets.—A very fair volume of business is reported, not quite so large in the aggregate, however, as in the previous week. Mills are pretty well engaged and have in some cases enough work to see them through the first three weeks of December. While there is still some testing of the market for early 1911 shipment, no business of that character has yet been reported. Prices are unchanged, the following range being named by Eastern makers for prompt deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—The volume of business offered in refined iron bars is small and competition for desirable specifications sharp, with the result that prices are again easier; in fact, it is difficult under existing conditions to name quotations which would actually represent the range of the market. For the ordinary run of business prices of refined iron bars are close to 1.35c. to 1.40c., delivered in this territory. Small lots and undesirable specifications, however, command a somewhat higher figure, while it is not unlikely that the

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quotations named would be shaded for a desirable tonnage. Steel bars are unchanged, at 1.55c., delivered.

Coke.—Quieter conditions are reported. Several large contracts for furnace coke for 1911 delivery are under negotiation, but buyers and sellers are, for the most part, still deadlocked on prices. Moderate sales of foundry coke are reported, but there is no real activity in the market. Prices are practically unchanged, \$1.65 to \$1.85, at oven, being named for furnace coke, with foundry grades at \$2 to \$2.35, at oven, according to quality. The following range of prices about represents the market, per net ton, delivered in this vicinity:

Connellsville furnace coke.....	\$3.85 to \$4.05
Foundry coke.....	4.20 to 4.40
Mountain furnace coke.....	3.50 to 3.90
Foundry coke.....	3.85 to 4.05

Old Material.—Little interest is being taken in the market, either by consumers or sellers. Mills' requirements are well taken care of by deliveries against old orders, and offerings must be in the nature of a bargain to arouse any interest. No. 1 heavy melting steel is evidently easier, although there has been little business transacted. One or more 1000-ton lots of strictly No. 1 grade, for delivery during the next two months, have been sold at \$13.50, delivered, although in the majority of instances mills hold to their nominal offering price of \$13, delivered, Eastern mills, but this figure brings out practically no tonnage. Rolling mills show no anxiety to enter the market, but in instances will take small lots, if the price is low enough. Quotations, under the circumstances, are practically nominal. The following range about represents sellers' ideas of the market for delivery in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia, ranging from 45c. to \$1.35 per gross ton:

No. 1 steel scrap and crops.....	\$13.00 to \$13.50
Old steel rails, rerolling.....	15.50 to 16.00
Low phosphorus.....	18.00 to 18.50
Old steel axles.....	19.50 to 20.00*
Old iron axles.....	26.00 to 27.00*
Old iron rails.....	17.50 to 18.00*
Old car wheels.....	13.50 to 14.00
No. 1 railroad wrought.....	16.00 to 16.50
Wrought iron pipe.....	12.50 to 13.00
No. 1 forge fire.....	11.00 to 11.50
No. 2 light iron.....	7.00 to 7.50
Wrought turnings.....	8.50 to 9.00
Cast borings.....	8.50 to 9.00
Machinery cast.....	14.00 to 14.50
Railroad malleable.....	13.50 to 14.00
Grate bars.....	11.50 to 12.00
Stove plate.....	10.00 to 10.50

* Nominal.

Buffalo

BUFFALO, N. Y., November 29, 1910.

Pig Iron.—General inquiry has slackened to some extent, evidently for the reason that a good many consumers have covered present requirements and are comfortably fixed for some time. There is still considerable tonnage to place to cover forward needs, however, as indicated by inquiries received and quoted on prior to the current week and not yet acted upon, for pump, radiator and pipe work, and from a good many of the smaller melters who have been carrying light stocks and are not covered for any great length of time. The week's inquiry, though light in total, included two or three lots of fairly good size for foundry irons, including one for 6500 tons from the leading electrical machinery manufacturing interest for its Eastern plants. Orders for the week have also fallen off in some degree as compared with the past week or two. Most of the tonnage booked was composed of carload to 100-ton lots, comprising foundry grades from small and medium sized melters, with a few orders for charcoal iron and specialties. In the face of the inactive market for new business, shipments from furnaces on contracts are going forward in good volume. The recent advance in price schedules by Buffalo district furnaces is being rigidly maintained. We quote as follows for remainder of year and first quarter:

No. 1 X foundry.....	\$15.00 to \$15.50
No. 2 X foundry.....	14.50 to 15.00
No. 3 plain.....	14.50 to 14.75
No. 2 foundry.....	14.25 to 14.50
Gray forge.....	14.00 to 14.25
Malleable.....	14.75 to 15.25
Basic.....	14.50 to 15.00
Charcoal.....	17.50 to 18.25

Finished Iron and Steel.—The market has been comparatively quiet, with less inquiry for bar material and other finished lines than for some time. The demand for wire nails, fencing and other wire products has fallen off noticeably, except for small lots, most of the large consumers having closed for first quarter requirements. This is the case also with users of tin plate and black sheets, many of whom have supplied their needs for some time ahead, although orders for small lots continue to come in. Notwith-

standing the slackened demand, prices on steel bars are firmly held at 1.40c., Pittsburgh, for large lots, and 1.45c. for small and miscellaneous lots. The Canadian export trade continues good, with a fair demand in all lines, but an especially good demand in bar material, plates and shapes. In structural lines a fair amount of business is going on, with considerable in sight for the early part of next year, if projects now talked of are carried out. Plans are soon to be out for a building to be erected at Erie, Pa., by the St. Johns Kanty College Association, requiring a considerable tonnage, and plans are also nearly completed for a branch factory to be erected at Newark, N. J., by the Linde Air Products Company of this city, calling for 100 tons. The Buffalo Structural Steel Company received the contract for fabrication and erection of steel, about 100 tons, for the Crosby Company's warehouse in this city, and the Syracuse Bridge Company the contract for steel work for convention hall and skating arena building to be erected at Syracuse by the Syracuse Arena Company, 200 tons. Bids opened to-day show the George Kellogg Structural Company to be low bidder for fabricating and erecting 100 tons for the H. D. Taylor Company's warehouse in this city. The New York State Prison Commission, Albany, is to receive bids December 15 for the 10,000 tons of structural material required for the new State prison at Wingdale, N. Y.

Old Material.—The market is quiet in all lines, and the indications point to a very dull December, as mills continue to curtail shipments on contracts, and there is practically no inquiry. Although dealers are offering scrap freely, the consumptive demand is exceedingly limited. Prices are somewhat easier. The schedule quoted below is largely nominal, but represents the market as accurately as possible, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$12.00 to \$12.50
Low phosphorus steel.....	17.00 to 17.50
No. 3 railroad wrought.....	15.00 to 15.50
No. 1 railroad and machinery cast scrap.....	13.50 to 14.00
Old steel axles.....	18.50 to 19.00
Old iron axles.....	23.00 to 23.50
Old car wheels.....	14.00 to 14.50
Railroad malleable.....	13.00 to 13.25
Boller plate.....	10.00 to 10.25
Locomotive grate bars.....	10.75 to 11.25
Pipe.....	9.75 to 10.00
Wrought iron and soft steel turnings.....	6.75 to 7.00
Clean cast borings.....	6.75 to 7.00
No. 1 busheling scrap.....	11.00 to 11.75

Cincinnati

CINCINNATI, OHIO, November 30, 1910.—(By Telegraph.)

Pig Iron.—Local agencies report a large number of inquiries being worked on, although few requests for prices have been received. While the market was expected to be rather dull during December, the present stagnation was not anticipated. Buying is subsiding, although for the first half 2000 tons of Northern foundry was taken by a southern Ohio melter at \$14. An Indiana manufacturer bought about 2500 tons of Southern foundry on a reported basis of \$11.25, Birmingham, and a local firm sold 2400 tons of malleable to a St. Louis consumer. Other sales include only carload lots to 500 tons, with the total about equally divided between Northern and Southern iron, shipments generally running through the first quarter. Southern iron is now freely quoted at \$11, Birmingham, for the first quarter, and some interests would not be averse to taking on business from old customers at the same figure, extending the delivery date through the second quarter, although \$11.50 is still being adhered to by some producers. Northern iron is quoted at \$14, Iron-ton, for either prompt or first half shipment, and the furnace interests state that they positively will not shade this figure. A few inquiries are out for Ohio silvery, but with the exception of a 200-ton sale for January-March delivery, very little has changed hands. Malleable is firm around \$14.25 to \$14.50, Iron-ton, for shipment as desired during the next seven months. The consensus of opinion locally is that the market will probably drag along until January, when most agencies believe there will be an improvement both in prices and amount of sales. For immediate delivery and for the remainder of the year, based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry.....	\$14.75 to \$15.25
Southern coke, No. 2 foundry.....	14.25 to 14.75
Southern coke, No. 3 foundry.....	13.75 to 14.25
Southern coke, No. 4 foundry.....	13.50 to 14.00
Southern coke, No. 1 soft.....	14.75 to 15.25
Southern coke, No. 2 soft.....	14.25 to 14.75
Southern gray forge.....	13.50 to 14.00
Ohio silvery, 8 per cent. silicon.....	19.20
Lake Superior coke, No. 1.....	15.70 to 16.20
Lake Superior coke, No. 2.....	15.20 to 15.70
Lake Superior coke, No. 3.....	14.70 to 15.20
Standard Southern car wheel.....	25.25 to 25.75
Lake Superior car wheel.....	22.25 to 22.75

THE IRON AND METAL MARKETS

(By Mail.)

Coke.—A local agency closed a contract this week for about 6000 tons of Connellsville furnace coke, for first half shipment, to a Virginia consumer. This represents the largest coke sale made here during the past few days. Foundry coke is being bought in carload lots, but no contracts for round tonnages can be reported. Spot furnace coke in the Connellsville district is available at \$1.50 to \$1.60 per net ton, at oven, while the contract price is from 5c. to 10c. over these figures. In the Pocahontas field furnace coke is now quoted for prompt shipment around \$1.65 to \$1.70, with the contract figure remaining about \$1.75 to \$1.85 per net ton, at oven. Wise County operations report the usual slack business and prices range from \$1.60 for spot furnace coke to an average of \$1.75 to \$1.80 for contract coke. Foundry coke in all three fields is obtainable at \$2 for prompt shipment and at \$2.25 per net ton, on contract.

Finished Iron and Steel.—Continued activity is to be noted, especially in structural material from warehouse. Prices remain around 1.75c. to 1.80c. from warehouse on beams and channels and steel bars. Iron bars are slow sellers and are quoted at 1.70c., from warehouse.

Old Material.—A prominent dealer attributes the present dullness in the market to the low price of pig iron and predicts that there will not be any pronounced activity until pig iron prices advance. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$12.50 to \$13.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	6.00 to 7.00
No. 1 cast scrap, net ton.....	11.50 to 12.50
Burnt scrap, net ton.....	8.00 to 9.00
Old iron axles, net ton.....	17.50 to 18.50
Old iron rails, gross ton.....	14.50 to 15.00
Relaying rails, 50 lb. and up, gross ton.....	22.50 to 23.50
Old car wheels, gross ton.....	12.00 to 13.00
Heavy melting steel scrap, gross ton.....	12.00 to 12.50

Cleveland

CLEVELAND, OHIO, November 29, 1910.

Iron Ore.—The lake shipping season will practically close November 30. Regular insurance will expire on that date, or five days earlier than last year. One or two shippers are still moving a little ore, but the last cargoes of the season will probably be sent from the upper lake ports tomorrow. While the general outlook for next year in the ore trade is not very favorable, ore firms predict a better volume of sales to Eastern furnace interests in 1911 than the very light tonnage taken during the past season. The improved Eastern demand is expected because of the heavy demand in England and Germany for Spanish ores and because of the advance in ocean freight rates that will increase the cost of Spanish ore delivered on the Atlantic seaboard. If the Lake Superior ore producers decide to reduce prices this will also stimulate their sales in the East in competition with foreign ores. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4.

Pig Iron.—Several sales of fair sized tonnages of foundry iron for first half were made to northern Ohio consumers during the week, and a moderate volume of new inquiries came out, most of them being for small lots. The foundry trade is rather quiet, some consumers being disposed to wait to see how business starts out after the first of the year, but others, particularly the smaller consumers, apparently see no reason for delaying their purchases until later. Prices remain stationary at \$14 at furnace for No. 2 foundry for the first quarter and half. This price was shaded by a local furnace on a sale of 500 tons of No. 2 to an Akron furnace manufacturer made during the week; other out of town inquiries, particularly where Valley furnaces are competitors for the business, will doubtless bring out slight concessions from the \$14 price. One local furnace that has been practically out of the market for some time, holding for \$14.50 for delivery after the first of the year, is now taking on tonnage at the \$14 price. For Cleveland delivery during the first half No. 2 foundry is quoted at \$14.25 to \$14.50, delivered. We note the sale of 1000 tons at the former price, but some sales have been made at the higher price. We also note the sale of 2000 tons of No. 2 foundry to another local consumer for the first half. Among the larger inquiries is one from a Cleveland stove manufacturer for 1500 tons, half Northern and half Southern. A local furnace manufacturer has bought 1000 tons of No. 2 Southern for first half at \$11.50, Birmingham, and is in the market for a similar tonnage of Northern foundry iron. Considerable Southern iron has been offered in northern Ohio during the past week at \$11, Birmingham, for No. 2 for the first half, but it is claimed that this low priced iron has either about all been sold or withdrawn from the market. A northern Ohio consumer has an inquiry out for 1500 tons of malleable

iron for first half. For the remainder of the year we quote, delivered Cleveland, as follows:

Bessemer	\$15.90
Northern foundry, No. 1.....	\$14.50 to 14.75
Northern foundry, No. 2.....	14.25
Northern foundry, No. 3.....	14.00
Gray forge.....	13.90
Southern foundry, No. 2.....	13.35
Jackson Co. silvery, 8 per cent. silicon.....	19.00

Coke.—A local interest is in the market for its first half requirements. There is very little inquiry for foundry grades, except for prompt shipment. Prices remain about stationary. We quote standard Connellsville furnace coke at \$1.45 to \$1.55 per net ton, at oven, for spot shipment, and \$1.70 to \$1.80 for delivery through the first half. Connellsville 72-hour foundry coke is held at \$2 to \$2.15 for spot shipment and \$2.25 to \$2.50 for first half.

Finished Iron and Steel.—The demand is only moderate. Mill agencies are getting a fair volume of orders, but they are nearly all small lots. Manufacturers are ordering only for their immediate requirements and are expected to allow their stocks to remain low until after inventory time at the first of the year. There is a fair demand for plates from boiler and tank makers. Reports indicate that manufacturers in these lines in northern Ohio are quite busy. With the coming on of winter, the demand for structural material has fallen off. Fabricating shops are not filled with work and are not specifying their usual tonnages on contracts. Considerable new structural work now in prospect will not be let until after the first of the year. The demand for reinforcing bars for concrete work continues quite active. The demand for shafting also continues good. Prices on steel bars and structural material are firm at 1.40c., Pittsburgh. Local mill agencies are adhering to that price on plates and claim not to be affected much by the competition of mills that are shading that price on narrow sizes. The demand for sheets is fairly active, but prices are not firm, concessions of \$1 a ton and possibly more being made by some of the mills on both black and galvanized. The demand for iron bars continues light and local mills are not getting enough orders to keep them running full. We quote iron bars at 1.30c. to 1.35c., at mill. The Director of Public Service of Cleveland will receive bids December 12 for 3500 tons of cast iron pipe for the City Water Department.

Old Material.—The market is in an unsettled state as regards prices. While dealers are still showing a flatter feeling, consumers are unwilling to pay more, and there are not enough transactions to establish well defined prices, the market having again quieted down after the recent spurt in porings and turnings. Local mills have good sized stocks on hand, so that with the exception of small lots little business is expected during the remainder of the year. The Erie Railroad list will close December 1 with about its usual tonnage. Dealers' prices, per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$14.00 to \$14.50
Old iron rails.....	16.00 to 16.50
Steel car axles.....	20.00 to 20.50
Heavy melting steel.....	13.25 to 13.50
Old car wheels.....	13.25 to 13.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	12.00 to 12.50
Railroad malleable.....	13.00 to 13.50
Light bundled sheet scrap.....	9.00 to 9.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings.....	6.50 to 6.75
Iron and steel turnings and drillings.....	6.75 to 7.00
Steel axle turnings.....	8.75 to 9.00
No. 1 busheling.....	11.00 to 11.50
No. 1 railroad wrought.....	13.00 to 13.50
No. 1 cast.....	11.50 to 12.00
Stove plate.....	10.50 to 11.00
Bundled tin scrap.....	11.00 to 11.50

James D. Frisbie, formerly manager of the Cleveland office of L. I. Bregman & Co. of Chicago, scrap iron dealers, has opened a brokerage office at 324 Garfield Building, Cleveland. He will deal in iron and steel scrap and relaying rails.

Birmingham

BIRMINGHAM, ALA., November 28, 1910.

Pig Iron.—The consumer has won out, it seems, in his fight for a basis of \$11, Birmingham, for pig iron to be shipped the first quarter, and during the past week three of the large producers have made that price pretty generally to favored customers. A large tonnage has been booked, relatively speaking, and it is now believed that buyers will cover to the extent of the business they have on their books. It is a well established fact that with the majority of the furnaces \$11 for No. 2 foundry means no margin of profit,

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practically no allowance for royalties on raw materials consumed nor any charges for depreciation of plant. In this market several orders have been booked for lots of 1000 tons each on the \$11 basis, while there have been good sales of special irons and special grades. Several lots of silvery gray changed hands at \$12 to \$13, depending upon the silicon content. There is no material change in the price of spot iron and no evidence is at hand to show that the \$11 schedule has been cut even for immediate shipment. Production remains at just about the same rate as for the first four weeks of the month. Furnace yards, in some instances, show evidence of slight accumulations during the current month, but so small that it will take a careful check on December 1 to really determine whether such be the case.

Cast Iron Pipe.—No new orders of consequence have come to the surface. Producers are hopeful that with the turn of the year business in all lines will have settled down to some steady basis and that a number of contracts that have been held up will then be placed. Quotations remain nominally about as follows: 4 to 6 in., \$20.50 to \$21; 8 to 12 in., \$20; over 12-in., \$19, with the customary difference of \$1 in favor of gas pipe. Naturally, on any large inquiries these prices could be shaded.

Old Material.—There is a better feeling among the scrap dealers. Some lots that have been on the market have been taken up and, in the opinion of the principal factors, prices are certainly no weaker. There is no change in the schedule as compared with last week and we continue to quote as follows, per gross ton, on board cars here:

Old iron axes.....	\$15.00 to \$15.50
Old iron rails.....	13.00 to 13.50
Old steel axes.....	14.50 to 15.00
No. 1 railroad wrought.....	13.00 to 13.50
No. 2 railroad wrought.....	9.00 to 9.50
No. 1 country.....	8.00 to 8.50
No. 2 country.....	7.50 to 8.00
No. 1 machinery.....	9.50 to 10.00
No. 1 steel.....	11.50 to 12.00
Tram car wheels.....	9.50 to 10.00
Standard car wheels.....	10.50 to 11.00
Light cast and stove plate.....	8.00 to 8.50

St. Louis

ST. LOUIS, November 28, 1910.

A speculative demand for pig iron is developing in this territory, and, while the price obtained for a round lot of Southern iron for forward delivery is not known, it is supposed to have been made at the current price for this iron for prompt shipment. It would appear that there is a disposition on the part of large buyers or speculators to regard iron as a purchase at around the market price. At the same time attention is called to the fact that Northern iron is relatively cheaper than Southern at competitive railroad points. General business is in satisfactory shape.

Coke.—All the leading offices report a very quiet market for the past week. While the tone of the market is rather easier we continue our quotations of the previous week. For best Connellsville 72-hour foundry, \$2.25 to \$2.50; second quality, \$2 per net ton, f.o.b. oven.

Pig Iron.—With but two exceptions all the leading brokers report a quiet week, as far as sales are concerned, though some of them were in receipt of a fair number of inquiries, many of which were regarded as having been made for the purpose of keeping posted on the market. Most of the inquiries reported the week previous are still pending, and several are undoubtedly from bona fide intending purchasers. One sale referred to above was 2500 tons of malleable Bessemer to a local foundry, for shipment over the first half. The other transaction was a sale of 7000 tons of Southern iron for first half delivery, for speculative purposes. An inquiry for 150 tons of Southern No. 2 foundry for shipment up to July, 1911, is mentioned. The irregularity in prices already noted still continues, and is doubtless occasioned by a disposition to force sales on the part of one or more Southern interests, while, on the other hand, notices of furnaces withdrawing from the market are mentioned. We continue our quotations of the previous week, as follows: Southern No. 2 foundry, shipment prior to new year's, \$11, Birmingham; for shipment over the first quarter and first half the range is nominally \$11.50 to \$12.

Old Material.—A feature of the market is a growing demand for old rails for reinforcement of concrete construction in building. There continues to be considerable inquiry for scrap iron and steel, but actual business, so far as any was in sight the past week, was mostly postponed to the following week, when a more active demand is anticipated by the leading dealers. Stocks in dealers' hands are moderate for the season, and there were no railroad offerings. Prices are not strong, but it is believed they are near bottom, or, in other words, after the turn of the year, an appreciation is likely to take place. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$14.00 to \$14.50
Old steel rails, rerolling.....	13.00 to 13.50
Old steel rails, less than 3 ft.....	12.25 to 12.75
Relaying rails, standard sections, subject to inspection.....	24.00 to 24.50
Old car wheels.....	13.00 to 13.50
Heavy melting steel scrap.....	11.75 to 12.25
Frogs, switches and guards, cut apart.....	11.75 to 12.25

The following quotations are per net ton:

Iron fish plates.....	\$11.50 to \$12.00
Iron car axes.....	18.50 to 19.00
Steel car axes.....	17.50 to 18.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	11.00 to 11.50
Railway springs.....	10.00 to 10.50
Locomotive tires, smooth.....	16.50 to 17.00
No. 1 dealers' forge.....	9.00 to 9.50
Mixed borings.....	4.50 to 5.00
No. 1 bushing.....	10.75 to 11.25
No. 1 boilers, cut to sheets and rings.....	9.00 to 9.50
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light cast scrap.....	9.50 to 10.00
Railroad malleable.....	9.00 to 9.50
Agricultural malleable.....	8.50 to 9.00
Pipes and flues.....	9.00 to 9.50
Railroad tank and sheet scrap.....	9.00 to 9.50
Railroad grate bars.....	8.50 to 9.00
Machine shop turnings.....	7.50 to 8.00

James B. Fisher has recently been appointed sales agent for the Sloss-Sheffield Steel & Iron Company for St. Louis territory, with offices at 1113 Central National Bank Building. Mr. Fisher has been with the company for several years and is well known to the trade in this section.

The work of installing the first 100 miles on the Illinois Traction System will begin in a few days, a contract having been signed with the Union Switch & Signal Company for the work, which will cost approximately \$150,000.

Metal Market

NEW YORK, November 30, 1910.

THE WEEK'S PRICES

Cents Per Pound.

Copper.		Electro-lytic.		Lead.		Spelter.	
Nov.	Lake.	Nov.	Lake.	Nov.	Lake.	Nov.	Lake.
25.....	13.00	12.87½	37.35	4.50	4.40	5.95	5.80
26.....	13.00	12.87½	.....	4.50	4.40	5.95	5.80
28.....	13.00	12.87½	37.30	4.50	4.40	5.95	5.80
29.....	13.00	12.87½	37.20	4.50	4.40	5.95	5.80
30.....	13.00	12.87½	37.35	4.50	4.40	5.95	5.80

The copper market is listless. Pig tin is higher than last week, but not very active. Spelter continues strong. Lead is firm at the advanced price made November 18.

Copper.—As is usual toward the last of the month, the copper market is quiet; both sellers and buyers seem to be awaiting the monthly announcement of stocks and production. While it is not thought that the statistics will show any unusual amount of domestic deliveries during the month, the report on exports will be encouraging, as to date 26,454 tons of copper have been sent abroad during November. Prices continue strong and prospective purchasers who have been feeling the market with a view to getting concessions have withdrawn without placing orders, which indicates that the holders of stocks are firm in their intention to keep the price up. Lake copper cannot be had for less than 13c., and electrolytic copper is firm at 12.87½c. At the close of the London market to-day spot copper brought £57 5s. and futures were selling for £58 3s. 9d. The sales amounted to 350 tons of spot and 700 tons of futures. The market was steady.

Pig Tin.—Although the market has strengthened, there has been very little buying. A Banca sale occurred November 24, when 2200 tons was sold at auction at a price equivalent to 36.50c., c.i.f. New York. This created a good impression in the London market, and prices here promptly advanced from 36.82½c. to 37.35c. During the week the market fell off about 15 points again. The New York Metal Exchange tin statistics for November will be out to-morrow, and they will show deliveries during the month of about 3800 tons. This will surprise many, as it is from 600 to 800 tons more than has been anticipated. The statistics will also show available stocks of 1674 tons, and it is probable that there will be a continued scarcity of spot tin. Pig tin was sold in New York this afternoon for 37.35c. The London market closed to-day with spot tin selling at £169, 15s., and futures at £170, 5s. The sales amounted to 220 tons of spot and 440 tons of futures. The market was firm.

Tin Plates.—The tin plate market is rather quiet. Some salmon packers have inquiries out for delivery over the first half. The price of 100-lb. coke plates remains at \$3.84.

Lead.—Notwithstanding the fact that there have been insistent rumors that the leading interest intends to make a further advance in lead, consumers have not come into the market. Outside sellers appear to be optimistic over the future, as they are demanding from three to five points

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more than the leading interest. The price of lead in New York continues at 4.50c., and in St. Louis, where the market is quite strong, it cannot be had under 4.40c., with some sellers demanding five points more than that.

Spelter.—The call for spelter is very light and the market is without interest. Sellers continue to hold spelter very firmly at 5.95c., New York, and 5.80c., St. Louis.

Antimony.—Antimony is quiet and slightly weaker. There is talk again of price cutting. It is certain that liberal concessions are being made by some sellers in Chinese and Hungarian brands. Cookson's is quoted at 8.15c.; Hallett's, at 7.75c.; Chinese brands, 99 per cent. guaranteed, 7.40c. to 7.50c., and Hungarian grades are around 7.12½c.

Old Metals.—The market continues dull. Dealers' selling prices are unchanged, as follows:

	Cents.	
Copper, heavy cut and crucible.....	12.50 to	12.75
Copper, heavy and wire.....	11.75 to	12.00
Copper, light and bottoms.....	11.00 to	11.25
Brass, heavy.....	8.25 to	8.50
Brass, light.....	7.00 to	7.25
Heavy machine composition.....	11.25 to	11.50
Clean brass turnings.....	8.00 to	8.25
Composition turnings.....	9.00 to	9.50
Lead, heavy.....	4.20 to	4.25
Lead, tea.....	3.95 to	4.00
Zinc scrap.....	4.30 to	4.40

Metals, Chicago, November 29.—Buyers are generally confining their purchases of metals to spot or nearby deliveries. The best brands of casting copper command a shade better than 13c., Chicago, but other brands can be had at that figure or slight concessions. There is somewhat of a deadlock between sellers and buyers of spelter, as buyers are not satisfied to pay the present market price for any extended delivery. Spelter experts, however, predict a curtailment in the supply during the coming year on account of the transition in that industry from gas to coal, which is now under way. Lead is quiet.

New York

NEW YORK, November 30, 1910.

Pig Iron.—Inquiry for pig iron has fallen off in the past week, and though it has seemed for some time that prices were on the bottom fresh concessions are reported on latest transactions. Furnaces in New Jersey and eastern Pennsylvania have been doing business for some time without profit, and it has been considered more likely that furnaces would generally be blown out than that iron would go lower; but, as a matter of fact, furnaces are still going for the most part and further reductions have come. In the past week several lots have been taken by pipe foundries, and three such companies have taken a total of about 9000 tons. A New Jersey company making heating furnace castings bought from 2000 to 3000 tons last week, and in the past few days has taken 1000 tons additional. The General Electric Company has an inquiry out for about 7000 tons for various grades of iron, deliveries to be made at Schenectady and Lynn. Considerable low phosphorus iron is called for in this case. Virginia furnaces are more actively seeking business, and \$12.75, at furnace, for No. 2 X is the basis of several transactions in New England and in New York territory. Alabama and Tennessee irons have sold at lower prices, but are not yet low enough to meet the cuts made by Northern furnaces in Eastern markets. Two steel companies in eastern Pennsylvania have bought about 18,000 tons of basic iron, deliveries in one case beginning in December and running through January. The other transactions were for the first quarter of 1911, and \$14.75 is reported to have been shaded. The foreign ore situation has taken such shape that business with Eastern furnaces is not likely to be done for some months. Ocean freights are high and the demand for ore in England and Germany has been so well sustained that all foreign ore canceled by buyers in this country a few months ago has been taken up. It is probable that if there were any demand on the seaboard just now for Swedish or Spanish ores 10c. a unit would be charged for ore that earlier in the year sold at 7½c. to 8c. a unit. We quote pig iron for 1910 delivery and the first quarter of 1911, as follows, at tidewater: Northern No. 1 foundry, \$15.50 to \$16; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$15.25; Southern No. 1 foundry, \$15.50 to \$16; No. 2, \$15.25 to \$15.50.

Finished Iron and Steel.—November closes the poorest month in the year so far in the amount of new business taken. At the end of the year it will probably still be the low month, for during December the railroads and manufacturers will be in the market with the deferred contracts for their spring requirements. The week just closed has been particularly quiet in all lines. Even bar iron, which has been holding up rather better than other lines, shows a marked falling off. Nothing in the present outlook indicates

a further reduction in prices, for it is very generally agreed that the present lack of orders is not a consequence of holding for lower prices. Bids for the private building of battleship No. 35 will be opened December 1 and it is probable that specifications for the material for No. 34, which will be built in the New York Navy Yard, will be out about the middle of the month. The Hay Foundry & Iron Works has the fabricating of the 4000 tons of structural material for the building being erected by Henry Corn on Madison Square, New York, and it is understood that the contract for the steel was placed with an Eastern mill about a month ago. The steel work for the Sloane warehouse is being re-designed and will eventually be in the market again, about 6000 to 8000 tons, but the material will not be needed before about the middle of next year. Bids close to-day on the contract for the Post-Office at the Pennsylvania Terminal, and it is known that a good many fabricators are bidding. The placing of the steel, about 6400 tons, is expected in the fairly near future. No decision has yet been reached on the 4500 tons, or thereabouts, required for the extension of the Boston Elevated Railway. Bids go in to-morrow for the 1911 requirements in bridge material, 3500 tons, for the Norfolk & Western. The Phoenix Bridge Company has taken 900 tons for the Union League Building in Philadelphia; the Eastern Steel Company, 400 tons for a hospital at Retreat, Pa.; the Bourne-Fuller Company, 220 tons for the Case School of Applied Science, Cleveland, and 300 tons for the Perry-Payne power house in the same city; the Wisconsin Bridge Company, 450 tons for the Duluth, Winnipeg & Pacific, and about 400 tons in small bridges for the Lehigh Valley has been divided between the Phoenix Bridge Company and the Cambria Steel Company. It is understood that the general contractor has decided on the placing of the contract for the steel for the Washington Irving High School. Prices remain unchanged: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.45c. to 1.50c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Ferroalloys.—Some excellent sales of ferromanganese have been made in this territory, and there are inquiries out for some good round lots. Prices have not been strengthened, quotations being \$38.50 to \$39 seaboard. Several large sellers, however, are holding ferromanganese firm at the higher figure. There is an excellent demand for ferrosilicon, which is somewhat scarce for spot delivery. The market is quoted at \$56 to \$56.50, Pittsburgh, and it shows signs of strengthening.

Steel Rails.—The Pennsylvania Railroad reports that it has given the steel companies orders for 150,000 tons of rails. There are no details as to the amounts the various rail companies are to receive, but some questions as to terms are yet to be arranged. The Illinois Steel Company took orders for 8000 tons of rails last week. Two contracts were closed by the Tennessee Coal, Iron & Railroad Company, one for 1000 tons of 60-lb. rails for the Fairburn & Atlanta Railway & Electric Company, and the other for 700 tons of 80-lb. rails for the Shreveport Traction Company.

Cast Iron Pipe.—The city of New Bedford, Mass., will open bids on 1500 tons of water pipe December 8. The general demand for pipe continues to be somewhat better than usual at this season. More contracts are being placed for spring delivery. Sharp competition is still being experienced for any business coming up for prompt delivery, as the stocks of standard sizes held by some of the Eastern manufacturers have not yet been disposed of. Carload lots of 6 in. continue to be available at \$22 or less, per net ton, tidewater.

Old Material.—Conditions in this branch of trade appear to be steadily growing worse. Sales of fair-sized quantities of heavy melting steel scrap and of some other classes of old material have been made, but only at reduced prices to meet buyers' views. Another cargo of Panama scrap was sold during the week, the successful bidder paying \$10.42 per ton. Prices generally are lower except on foundry stock, which is not in over supply and is therefore rather steady. Dealers' quotations per gross ton, New York and vicinity, are as follows:

Re-rolling rails.....	\$11.50 to	\$12.00
Old girder and T rails for melting.....	10.50 to	11.00
Heavy melting steel scrap.....	10.50 to	11.00
Relaying rails.....	20.50 to	21.50
Standard hammered iron car axles.....	22.00 to	23.00
Old steel car axles.....	16.00 to	16.50
No. 1 railroad wrought.....	13.00 to	13.50
Wrought iron track scrap.....	11.50 to	12.00
No. 1 yard wrought, long.....	11.50 to	12.00
No. 1 yard wrought, short.....	11.00 to	11.50
Light iron.....	5.00 to	5.50
Cast borings.....	5.50 to	6.00
Wrought turnings.....	5.50 to	6.00
Wrought pipe.....	9.50 to	10.00
Old car wheels.....	12.00 to	12.50
No. 1 heavy cast, broken up.....	11.50 to	12.00
Stove plate.....	8.50 to	10.00
Locomotive grate bars.....	5.50 to	9.00
Malleable cast.....	12.00 to	12.50

The Machinery Markets

Business in the machinery trade is dragging somewhat in a number of selling centers, due to a certain extent to the absence of railroad buying. Manufacturers as a rule continue optimistic as to the future, however, as many of them are making machinery for stock with a view to supplying the demand they expect will develop. Philadelphia, Baltimore, Cincinnati and Detroit all report business quiet. In Chicago a better demand has developed, but lack of orders from the automobile makers is still felt. Business is very good in the South, and municipal improvements in Virginia are contributing largely to the demand from that part of the country. A good business is being done on the North Pacific Coast for boilers, tanks, pumping machinery and heavy equipment, and in the Northwest many plans for municipal development denote that there will be a good call for machinery for power plants, water works, &c., in the near future. The Pittsburgh market is improving slightly and there is an excellent demand for electrical equipment. The export demand continues especially good, and from all markets where the export trade is a feature come reports of a good call for about every class of machinery.

New York

NEW YORK, November 30, 1910.

Business continues quiet in the New York machinery trade and it appears that the pre-holiday lull, which usually arrives a couple of weeks before Christmas, is here ahead of time. There is an actual absence of railroad buying, and beyond a few scattered orders for small lots of tools very little has been done during the last week in this market. A number of new enterprises which have been before the trade for some time seem to have been held up, as machinery houses report great reluctance to place orders on the part of people who were expected to be buying at this time. There are some very good inquiries before the trade, but it is hard to determine whether the people asking for bids on equipment are in earnest or not.

Fortunately for the trade at this time, export business continues good. Men connected with the largest foreign machinery house selling American equipment declare that the business outlook in Europe is especially good and they are looking for a great deal of machinery trade in that direction. There has been a good, steady volume of buying from all of the European countries during the last few weeks, and some decidedly good business is in sight. About the only exception to the rule is the present condition of the machinery trade in Italy, where the automobile industry has fallen off noticeably. Automobile manufacturers were the largest buyers of American machinery in that country, and many of them have of late been cramped for funds because of a sudden falling off in the demand for their products. The company which was formed by French automobile manufacturers a couple of years ago to manufacture machine tools, with a view to providing their wants in equipment which they were obliged to buy from this country, has not been entirely successful, as it has been unable to duplicate American machine tools and it certainly has not cut into the trade, according to statements made by those familiar with the situation. As a matter of fact, France has been one of the largest buyers of American machine tool equipment during the last year, and the automobile manufacturers there were among the best customers. It is a significant fact that a number of companies which hold stock in the machine tool manufacturing corporation mentioned above have been liberal purchasers of American machine tools. Some good business is looked for from Germany, as the last 12 months have been very prosperous in the machinery trade there. It is declared that about every machinery manufacturing house of any consequence in Germany and France increased its dividends during the last fiscal year. The only exception to this rule has been the bicycle industry. The bicycle has retained its popularity in Europe to a far greater extent than in this country, but there has been a certain amount of overproduction of bicycles in the German manufactories especially, which has resulted in considerable money being tied up in that industry. The German Government has been placing some especially large orders for railroad equipment during the last few weeks, and manufacturers of railroad supplies there will be busy for many months to come. Some of them are already planning enlargements and their inquiries indicate that their machinery purchases will be especially heavy. The demand for American machine tools from England has been very good, and from all accounts business in the metal industries there is much better than it has been in this country of late. There are some very good inquiries in the market from English manufacturers for American machine tools and woodworking machinery for delivery over the next three months. Taken altogether, this information, which comes from an authoritative source, should mean that the

export trade will continue to strongly support the machinery market here.

It is announced that the business of the A. S. Cameron Steam Pump Works, which was recently taken over by the Ingersoll-Rand Company, 11 Broadway, New York, will be conducted as a separate enterprise, and to that end the Cameron Company has been incorporated. No change will be made in the policy of the company nor will any immediate change be made in the line of manufacture. The incorporators declare that the affairs of the Cameron Company will not be merged with those of the Ingersoll-Rand Company beyond that the latter organization will control the new corporation's stock. The Cameron Company elected the following officers: President, George Doubleday; first vice-president and treasurer, W. R. Grace; second vice-president and general manager, George W. Fuller; secretary, F. A. Brainard. All of the above named and W. L. Saunders, president of the Ingersoll-Rand Company, and Joseph P. Grace are directors.

The United International Motor Companies, Ltd., has been formed in England to manufacture the United States Motor Company's line of equipment in Europe. The designs and patents of the Maxwell, Brush, Columbia, Stoddard-Dayton, Courier and Sampson automobiles will be turned over to the English company and the plant will be constructed there for the manufacture of at least some of these cars. While it is announced that machinery for the proposed manufacturing plant will be purchased abroad, it is certain that a large line of American machine tools will be installed in the plant.

The American Smelting & Refining Company has been purchasing generously in this market within the last few weeks for a number of its smelting plants. Among other orders placed by this company is one for 58 automatic stokers given to the American Stoker Company, 11 Broadway, New York. This is the largest order for automatic stokers ever placed in the trade and it represents an expenditure of \$60,000. The equipment will be used at the plant of the Ray Consolidated Copper Company at Hayden Junction, Ariz., and at the Chino smelter at Santa Rita, Mexico.

The Victor Appliance Company, Watervliet, N. Y., has leased a manufacturing building and has purchased a line of equipment for manufacturing automobile and motor boat specialties. The company may later on be in the market for a lathe with about 30-in. swing, a drill and some small tools such as reamers, taps, twist drills, &c.

The boiler department of the Brooks plant of the American Locomotive Works at Dunkirk, N. Y., has been moved into new buildings recently completed. An addition is to be built to the old boiler shop, of concrete, brick and structural steel, and will be equipped for use as a part of the machine department.

The city of Binghamton, N. Y., has completed plans for the erection of a sewage disposal plant to be located on the south side of the Susquehanna River, opposite Riverside Park. Jno. A. Giles is city engineer.

A water works pumping station for artesian well supply and an electric lighting plant is to be built by the village of Silver Springs, N. Y. An issue of bonds has been authorized and the village clerk will receive bids for plant construction.

The Commissioner of Public Works, Buffalo, N. Y., Francis G. Ward, Municipal Building, is receiving bids for one or more sand blast machines for cleaning structural steel work of city viaducts and bridges.

The J. W. Storandt Mfg. Company, 322 St. Paul street, Rochester, N. Y., has plans completed for a showcase factory 122 x 318 ft., one story, which it will erect on Lyall avenue early next spring.

F. C. Stevens, Superintendent of Public Works for the State of New York, Albany, is receiving sealed proposals for

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the building and equipping of a hydroelectric power plant on the Erie Canal, near the east end of Crescent Dam, contract No. 91. Also for the construction of lock No. 1 and dam No. 1, near Cayuga, contract, 91a; for gate house, culverts, &c., for the Erie Canal feeder between Trenton Falls and Nine Mile Creek, contract No. 51, and construction of bulkheads and dam across the Oswego River at Phoenix, N. Y., contract No. 80.

Catalogues Wanted

The King Sewing Machine Company, Buffalo, N. Y., desires catalogues of manufacturers of melting furnaces and apparatus for tinning, plating, &c.

Chicago

CHICAGO, ILL., November 29, 1910.

The machine tool trade in the West is slow in recovering from the depression of the past six months, but there is some improvement in the volume of inquiry and a little more business is being done. There has not been enough growth in the demand for high class tools to make up for the loss of automobile trade. The slump in that industry has had a widespread effect on the market, as it influences a great deal of trade outside of automobile factories. A surprisingly large number of factories and machine shops in other lines did a thriving business a year ago in supplying parts and accessories. Most of their machine screws and products of screw machines and other automatic tools were purchased outside from shops which had the equipment to supply what was wanted. A great many foundries in Chicago territory furnished machine finished castings in gray iron, steel or brass, and the loss of this trade has had a dampening effect on purchases of new tools in scores or even hundreds of manufacturing plants which were not publicly known to be identified with the automobile industry. While these plants are still doing a fair amount of business, many of them are not operating at the present time more than half of the tools in their shops. Dealers who specialize in railroad shop equipment have also been disappointed, as very few purchases have been made this fall by Western railroads and in some cases this business has been handled in a manner that invites criticism. Railroad shops are all the way from 10 to 20 years behind commercial machine shops in their equipment, and when they do make a purchase of new tools it is not uncommon for them to specify something out of date. Their method of shop management does not keep them in touch with the progress of the machine tool industry and their shops are stagnant backwater in the stream of mechanical evolution. Dealers who follow this trade still have hopes that the railroads will buy more liberally after the first of the year, but meantime they are giving prompt attention to all the inquiries they get from manufacturers and other progressive buyers.

The Avery Company, Peoria, Ill., is preparing for the erection of a new warehouse at Aberdeen, S. D., 98 x 300 ft., which will be equipped with modern apparatus for handling heavy machinery.

The Dower Place Automobile Company, Aurora, Ill., certifies to a change of name to Morlock Mfg. Company; also to an increase in capital stock from \$25,000 to \$30,000.

The Swanson Mfg. Company, Shenandoah, Iowa, will remove its plant to Marseilles, Ill., where it will occupy the entire plant recently vacated by the Marseilles Mfg. Company. The company manufactures farm implements and its business has outgrown its present manufacturing facilities.

Philadelphia

PHILADELPHIA, PA., November 29, 1910.

From present indications neither manufacturers nor merchants in this territory will be able to report any material change for the better, as far as business during November is concerned; in fact, quite a few have already stated that the aggregate month's sales would be smaller, not only as compared with the previous month, but also for the same period last year. Speaking generally, business continues to drag and there is little promise of marked betterment in the near future. Railroad buying is apparently as far off as it was some time ago. Tool purchases by the railroads in this territory were extremely light during the month, consisting of odd lots. Purchases by industrial concerns have been few; with plants operating at practically half capacity, as is largely the case in the iron and steel industry, there is little incentive to purchase new equipment; the local locomotive builder has, however, purchased a few tools, mostly

planers, but is now understood to have its requirements filled. Transactions are confined, as a rule, to single tool propositions, recent sales being principally of the smaller class of equipment. In the majority of instances prompt deliveries are factors, as purchasers have put off actual buying until the last moment; practically all sellers can, however, meet this condition, the only exception noted being in some makes of milling machines.

Inquiries are light and mostly of a small size. One or two fair sized propositions are being figured on, however, by some sellers, but these have not come before the general trade. A trifle better movement in second-hand machine tools is reported, in some instances tools being taken for temporary equipment.

Charles H. Casper, engineer, West End Trust Building, is taking subbids for construction work on an addition to the refrigeration plant for Weger Brothers, Thirty-second and Master streets. The building will be of brick, steel and concrete. There will be a considerable amount of wrought iron pipe work required, as well as a number of wooden tanks.

The National Ammonia Company of Pennsylvania is asking for bids for the erection of a warehouse, 37 x 50 ft., and an anhydrous ammonia factory building, 48 x 85 ft., to be erected at its plant on the Delaware River near Wismoming lane.

The Pennsylvania Equipment Company, West End Trust Building, is in the market for several standard gauge flat bottom gondola cars for hauling heavy stone blocks. They should be of 30 to 40 tons capacity and have drop bottom doors in the center of the car.

The contract for the erection of the new crucible steel casting plant for the Hess Steel Company, Bridgeton, N. J., has been let. The building, it is understood, is to be of brick, 70 x 120 ft., and will contain 16 crucible steel melting furnaces, as well as the molding floors. It is stated that immediately on the completion of this building a second one of like size will be erected. John A. Coyle, Bridgeton, N. J., can furnish any information desired.

The Hess Machine Works reports a continued fair demand for special file making machinery, both from foreign and domestic buyers. Orders have recently been booked for one set from a European buyer. An order for five sets of file making machines, from a user in the Middle West, is also noted. There has been a moderate demand for special machinery of various kinds and the plant continues actively engaged.

The C. H. A. Dissinger & Bro. Company, Wrightsville, Pa., has acquired several acres at Lancaster, Pa., on the main line of the Pennsylvania Railroad, on which is being erected a plant for the manufacture of its Capital line of gas and gasoline engines. The foundry will have a capacity of 10 to 15 tons per day. Pattern shops, cleaning rooms, &c., are also being erected. The machine shop will be 64 x 210 ft. A main electric generating plant will be installed, while the tools will be driven by individual motors.

Fire damaged the plant of the Philadelphia Iron Works, Eighteenth street and Pennsylvania avenue, early last week, entailing a loss of about \$25,000. The tool room, machine shop and a portion of the main boiler shop were destroyed. Efforts are being made to get the plant in shape for temporary operation, and some portions will resume work about December 1. A large share of the tools and machinery was destroyed, and the company is purchasing temporary equipment, including punches, lathes, shapers, drills and tool room machinery.

New England

BOSTON, MASS., November 29, 1910.

The situation as it relates to the demand for machinery and other equipment remains unchanged. The market is dull, and November's business has perhaps not exceeded October's. As in earlier months of the year, the machinery builders have varying experiences. Some reports of improvement are heard, but as a whole production is well in excess of orders. The general feeling is that no economic obstacle exists to a steady improvement, perhaps slow, perhaps with an acceleration that will make the first months of 1911 entirely satisfactory. Everyone, apparently, looks for a good year to come. Export business is improving more rapidly than domestic.

A notable group of manufacturing plants will be built immediately at South Framingham, Mass., creating the nucleus of what promises to be an important industrial suburb of Boston. The Ames Plow Company, Boston and Worcester; the Gaylor Engineering Company, Worcester, and the Gurney Heater Company, Boston, will each erect large works, involving a total expenditure of some \$500,000, including the purchase of much new machinery and foundry

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and other equipment. More than 500 men will be given employment. The plans of the Gurney Heater Company, manufacturer of heating apparatus, have been mentioned in this column. South Framingham, 20 miles from Boston, is located advantageously on the main line of the Boston & Albany Railroad, as well as on the New York, New Haven & Hartford, and the Boston & Maine systems.

The Ames Plow Company, with works at Worcester and main office in the Quincy Market, Boston, has purchased about 9 acres in South Framingham, on the New York, New Haven & Hartford Railroad, a short distance from the freight and passenger depots of the several railroads. A complete plant, modern throughout, will be erected on the premises, giving between 110,000 and 115,000 sq. ft. of floor space. While details are not completed, the works will consist of a one-story main building, with saw tooth roof, if the topography of the site permits of an arrangement with a northern exposure, or, as the alternative, with triple monitor roof. The building will be given over to the machine shop and woodworking department. Another large one-story structure, with double monitor, will be occupied by the foundry, forge shop and cleaning department. A power plant, storage building with several floors, and storage sheds for foundry materials and lumber, will complete the works. A complete electrical installation will be purchased, including motors and transmission for electric drive in units. A large part of the foundry equipment will be new. An industrial railroad will be built. Much new machinery for the shops will be bought. New equipment will mean the expenditure of between \$30,000 to \$40,000. Two spur tracks will serve the shops. The shops at Worcester, on Prescott street, have been occupied for many years, and no longer meet the demands of the business. The future of the old plant is not definitely determined. The Ames Plow Company manufactures plows and agricultural vehicles and wheelbarrows in extensive lines, together with other farming implements. A large business has been done for years, export orders constituting an important part of the total.

The Gulyer Engineering Company, better known as Marcus Mason & Company, Worcester, builds coffee and sugar machinery, and does a large business, especially with Central and South America and the West Indies. The company has purchased a large tract of land in the general vicinity of the new properties of the Ames Plow Company and the Gurney Heater Company, and, it is given out, will build in the near future. The present shops are in an old building on Union street, Worcester.

The first expenditure under the \$2,500,000 appropriation for the repair shops of the Boston & Maine Railroad will be for modernizing existing facilities with the purpose of securing immediate results. The new shops, for car and locomotive repair, will be pushed along, and plans are now well under way. But considerable time will elapse before the great works will be available, and in the mean time the old shops will be brought up to date. Engineers are busy studying the problem. By replacements of old type machinery, additional equipment and rearrangement, it is believed that a very much larger producing capacity will be created. The Boston & Maine shops have long been inadequate—in fact, most of them are antiquated and expensive to operate. Even the new running repair shop for locomotives at Somerville received some old tools from old shops. The first shops to be modernized are those at Lyndonville, Vt., and Concord, N. H.

C. O. Churchill and L. Holst, Binghamton, N. Y., will establish works at Westfield, Mass., for the manufacture of valves and foundry products. A tract of land has been purchased on the Boston & Albany Railroad and a foundry building will be erected immediately, to be followed later by a machine shop. Messrs. Churchill and Holst are connected with the Georgian Mfg. Company, Binghamton, the former as superintendent and the latter as general foreman, and both were formerly with the Chapman Valve Company, Indian Orchard, Mass.

The new plant of the Baird Machine Company, Oakville, Conn., to be built at Bridgeport, Conn., will consist of a main factory building, forge shop, foundry, power plant, pattern shop, storage building and office building. The Fletcher Engineering Company, Bridgeport, is getting out the preliminary plans and specifications. No details are as yet available.

A company headed by Charles B. Rood, Chicopee Bank Building, Springfield, Mass., is establishing a factory for the manufacture of an instrument known as the telegraphone.

The Penobscot Realty Company has begun work on a power plant at Orono, Maine, which will develop between 3000 and 5000 hp. and is estimated to cost about \$300,000.

Cobb, Butler & Co., Rockland, Maine, have been awarded the contract to build two large fishing steamers for the Atlantic Fertilizer & Oil Company, New York, while a third steamer of the same class will be built by A. D. Storey, Essex, Mass. The contract for the boilers, engines, elec-

trical apparatus and other equipment has been given to the Portland Company, Portland, Maine.

The New London Ship & Engine Company, Groton, Conn., will erect a new boiler house and a storage building in connection with the new machine shop at its plant.

The New England Electric Supply Company has purchased the business of the New England Engineering Company, Hartford and New Britain, Conn., and will conduct a wholesale electrical jobbing business in Hartford. The New Britain office has been closed. H. E. Page is the president, T. J. O'Brien secretary and F. W. Drager treasurer.

The Waterbury Tool Company, Waterbury, Conn., has purchased 5 acres of land on Watertown road, across the track from the property of the Waterbury Rolling Mills Company. H. G. Hoadley, president and treasurer of the company, states that no definite plans have been made for utilizing the land.

General industrial projects include the following: B. F. Smith Company, Pawtucket, R. I., contractors, three-story carpenter shop to cost \$15,000; Palmer & Parker Company, Charlestown, Mass., woodworking mill, 60 x 110 ft., two stories; Soule Mill Corporation, New Bedford, Mass., picker house, 64 x 95 ft., with five-story cotton storage building and a warehouse; Cheney Bros., South Manchester, Conn., silk weaving mill, 100 x 425 ft.; Dummer Cotton Mills, plant at Brattleboro, Vt., to employ 300 hands. A dispatch from Providence, R. I., states that a British syndicate has taken the Niantic Dyeing Company, Niantic, R. I., and proposes to spend \$1,000,000 in the construction of a new bleachery and other buildings.

Cincinnati

CINCINNATI, OHIO, November 29, 1910.

A machinery salesman who recently returned from a trip through West Virginia comments on the rapid development work going on in that State. He also advises that Cincinnati is not getting a full share of business in this particular territory. Several municipal water works and electric light plants are either in the course of construction or contemplated, and also the demand for mining machinery, including pumps, boilers, &c., is on the increase at the present time. The mining district further furnishes a fairly good market for the smaller sizes of machine tools, and he states there is no good reason why the bulk of this business should not be booked by Cincinnati manufacturers and dealers.

The machine tool business is very spotty now. One builder reports some nice orders received during the past few days, while his neighbor, making the same class of tool, is compelled to put part of his output in stock to avoid shutting down. Nearly every local plant continues running full time, but a few have been compelled to curtail working forces. Generally speaking, November business has only been fairly good in most manufacturing lines in this vicinity, and as December is always a dull month, no big improvement is anticipated until after the first of the year.

The Mastic Wall Board & Roofing Mfg. Company, whose Cincinnati offices are at 33 East Third street, has purchased a 6-acre site at the corner of Spring Grove avenue and Este street, on which will be erected six manufacturing and storage buildings, one and two stories, all of concrete construction. The company makes a patented substitute for lath and plaster, sheathing, roofing and shingles, and now operates plants at New Orleans, La., and Alma, Mich. The Cincinnati plant will more than double the combined output of the factories named. The executive offices, now in New Orleans, will be moved to Cincinnati on completion of the new plant.

The Triumph Electric Company, Oakley suburb, Cincinnati, reports an increased number of inquiries and a decided improvement in the small motor business. Recent contracts include seven motors, ranging from 5 to 60 hp., for the Cincinnati Bickford Tool Company; six for the Marrowbone Coal & Coke Company, 28, of various sizes, for the Cincinnati Butchers' Supply Company, and several large and small capacity motors for H. T. Lloyd, Spokane, Wash. In late orders for generators is a 600-kw. one, for the Factory Power Company, Oakley; two of smaller capacity for the University of Cincinnati, two for the Westinghouse-Church-Kerr Company, and a miscellaneous lot of both motors and generators for shipment to customers in this country and Canada.

Secretary Manley has received a large number of acceptances to invitations for the December 8 meeting and dinner of the Cincinnati branch of the National Metal Trades Association, and the meeting is expected to be the banner one of the year.

To manufacture boilers, the Sistersville Boiler Works has been incorporated at Sistersville, W. Va., with \$25,000 capital stock. The incorporators are E. A. Ryan, J. P. Ryan,

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H. W. McCoy, S. G. Messer and A. C. Jackson, all of Sistersville.

The Pioneer-Peerless Gas Coal Company has been incorporated at Dry Branch, W. Va., with \$25,000 capital stock, for the purpose of mining coal and manufacturing coke. The incorporators are J. G. Vaughan, W. D. Vaughan, W. A. Kennedy and J. H. Vaughan of Charleston, and P. E. Gallagher of Pratt, W. Va.

The Rassel Motor Car Company has been incorporated at Toledo, Ohio, with \$125,000 capital stock, by E. C. Rassel, R. S. Logan, Wm. E. Brown, Edwin Tait and N. W. Rassel.

The Universal Pattern Works, Cincinnati, is moving from its old location on Eighth street to a newly constructed one-story concrete building on State avenue.

The Grafton Light, Heat & Power Company, Grafton, W. Va., has been incorporated, with \$200,000 capital stock, by John T. McGraw, A. S. Warder, Jr., Chas. R. Durbin, A. Hood Phillips and John T. McGraw, Jr., all of Grafton.

The Hazleton Milling Company is a new incorporation, with \$10,000 capital stock, at Hazleton, W. Va. The incorporators are J. J. Kelley, A. J. Moyers, T. W. Wakefield, R. Frazee and W. D. Arthur. A feed and flour mill will be erected.

The Cincinnati Bickford Tool Company commenced last week moving equipment from its Spring Grove avenue plant into its new home at Oakley. It hopes to have the new plant in operation by January 1. The D. T. Williams Valve Company, that leased the Spring Grove avenue factory, is transferring its machinery from the downtown location as fast as the space is vacated by the tool company.

Bids will be opened December 20 for furnishing and installing an additional compressor, piping, &c., in the power and lighting plant of the Boys' Industrial School, Lancaster, Ohio. Specifications are on file in the office of Harold M. Bush, engineer, 69 North Fourth street, Columbus, Ohio.

Work on the new three-story plant of the American Valve & Meter Company, Spring Grove avenue, Cincinnati, has progressed far enough to insure the company having all its machinery installed by February 1. The company manufactures railroad specialties, and states that the large number of small orders received has kept its present plant on Gest street operated up to full capacity all during the past year.

The new plant of the Straub Machinery Company in Cumminsville suburb, Cincinnati, is 140 x 250 ft., of concrete, brick and steel construction, two stories. It will be ready for occupancy before January 1. Burr stone mills for grinding wheat or corn are manufactured, and the company reports both its domestic and export business as having been excellent almost the entire 11 months past.

The Sidney Mfg. Company, Sidney, Ohio, has increased its capital stock from \$75,000 to \$100,000.

Cleveland

CLEVELAND, OHIO, November 29, 1910.

The improvement noted in the local machine tool market last week continues. Dealers received a few good inquiries during the week from manufacturers who are contemplating plant extensions, and some business that has been pending for several months has finally been placed. Dealers are looking for a better volume of orders during the coming month than in November, although orders during the last month of the year are expected to be largely for single tools. Dealers are hopeful of considerable increase in the volume of business soon after the first of the year. Some of the machine tool builders report an improvement in their orders. Builders who with a good demand are unable to keep up on deliveries are taking advantage of the quiet spell to make tools for stock, and continue to run their plants at full capacity, being confident that they will not have to wait long to dispose of their surplus stock.

In electrical equipment the demand for small motors has improved somewhat and is fairly good. The outlook for orders for large units is more promising than for some time, some good business being in prospect in large equipment for central stations and railroads.

In the foundry trade the demand for light castings is only moderate, although some of the foundries have about all they can do. A better volume of orders is looked for after the first of the year.

Sealed bids will be received by the Director of Public Service, Cleveland, December 12, for two vertical triple expansion pumping engines, each of 25,000,000 gal. daily capacity, for the enlargement of the Kirkland pumping station.

The Premier Vacuum Cleaner Company, Cleveland, has been formed to place on the market a portable electric suction cleaner. The company has offices at 514 Columbia Building and has established a factory in the Commercial

Building. Officers have been elected as follows: President, Charles A. Kolp of Canton; manager, E. L. Franta; treasurer, F. J. Miller; secretary, R. E. Hyde.

The National-Acme Mfg. Company, Cleveland, reports a fair volume of orders in its screw machine department, an improvement being noticed in both the domestic and foreign demand. The company is now operating this department overtime, making some machinery for stock in order to be in better shape to make deliveries when the demand for automatic machinery becomes more active.

The Ohio Sheet Metal Works, Cleveland, has been formed by Robert Kain and E. F. Auinger, both until recently connected with the Ohio Roofing Company in Cleveland. The new concern has established a plant in a two-story building, 35 x 80 ft., at 2491 East Thirty-seventh street, and will do all kinds of sheet metal work and manufacture sheet metal specialties. A large press and probably some other equipment will be purchased.

The Cleveland Metal Stamping Company, now located at 321 Frankford avenue, Cleveland, has commenced the erection of a new plant at Payne avenue and Thirty-first street. The building will be of brick construction, 65 x 100 ft., two stories, and will provide nearly four times as much capacity as the present plant. The company will install an additional plating plant and will buy some new presses and screw machines. The plant will be equipped with a 35-hp. gas engine, and a little later another engine of the same capacity will be added.

Through the efforts of the Board of Trade and Business Men's Club in Canton, Ohio, several new industries will shortly be established in that city, and two large manufacturers in metal working lines have now under consideration propositions for the removal of their plants to Canton. The Clay Products Company and Sala Brothers, the latter garment manufacturers now operating a plant in Minerva, Ohio, with a branch in Canton, will erect new plants in Canton. The Union Metal Post Company in Canton is looking for a site for a new plant with the view of doubling its present capacity. Some of the Canton manufacturers of sheet metal products are also considering plant extensions, which are expected to be started in the spring.

The Kline-Marshall Furnace Company, recently incorporated at Canton, Ohio, with a capital stock of \$40,000, to manufacture warm air furnaces, will begin the erection of a new plant as soon as a site can be secured. This will include two buildings, a foundry, 40 x 120 ft., one story, and an assembling building, 40 x 80 ft., two stories. The company will be in the market for the necessary foundry and other equipment. The company now has offices at 210 East Fifth street. Officers have been elected as follows: President, Dayton Marshall; vice-president, O. T. Clewell; secretary and manager, George L. Viers; treasurer, Walter Kline.

The Toledo-Massillon Bridge Company, Toledo, Ohio, has changed its name to the Toledo Bridge & Crane Company, the new name being more appropriate to the company's present line of products, which include electric cranes and hoists.

The Huebner-Toledo Breweries Company, Toledo, Ohio, will shortly enlarge its plant by the erection of three large buildings. One of these will be a refrigerator plant, 93 x 226 ft., four stories, of brick and steel construction.

The Board of Trustees of the Boys' Industrial School at Lancaster, Ohio, will receive sealed proposals December 20 for additional compressors, piping, &c., for the light, heat and power plant of that institution.

The Faultless Machine & Mfg. Company, Akron, Ohio, has been formed with a capital stock of \$10,000 by C. A. Wild, Edward C. Paul, E. G. Major and others.

Pittsburgh

PITTSBURGH, PA., November 29, 1910.

The attention of manufacturers, jobbers and dealers in this district is being turned more and more toward the opening of the new year, as with the holidays and inventory period intervening there can be no prospect of any sustained revival in trade meanwhile. In the various related branches of the electrical industry, however, the demand from all parts of the United States, as well as some foreign countries, continues excellent.

An order for a direct current generating unit of 200 kw., engine driven, has been placed with the Westinghouse Electric & Mfg. Company, Pittsburgh, by the Sunday Creek Company, Carbondale, W. Va., as a result of important improvements in the company's equipment that are to be effected.

The Iron City Spring Company, Pittsburgh, will remove shortly to new quarters at 2920 Smallman street, its present

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location on Allegheny avenue being no longer adequate to the requirements of the business.

An increase is to be made after January 1 in the equipment and daily capacity of the plant heretofore operated by the Apollo Silica Brick Company, Apollo, Pa., which has just been purchased by Bruce H. Campbell, J. Waters and W. H. Hill of Johnstown, Pa.

Following the completion of the new boiler and tank shop, which will soon be ready for service, the Erie City Iron Works, Erie, Pa., will take up the plans for the new foundry building to be erected in the spring. The details of the latter have not yet, however, been fully determined upon.

The city authorities of Erie, Pa., now have under consideration the purchase of a pumping engine of 20,000,000 gal. daily capacity, and the water commissioners will visit other cities in order to inspect recent installations with a view to deciding upon machinery of the most efficient type.

It is reported from Mt. Vernon, Ohio, that extensive improvements are to be made in the plant heretofore operated by the Mt. Vernon Railway & Light Company, which has been taken over by the Mt. Vernon Electric Company, newly incorporated. The present equipment includes five General Electric generators totaling 500 kw. in capacity, driven from engines built by the Ball Engine Company.

The new plant of the Harwood Electric Heating & Power Company, at Freeland, Pa., which was recently placed in operation, will furnish power to mines and industrial plants in that vicinity; and, as its service is gradually extended, there will be many more opportunities than heretofore for the sale of motors and electrically operated machinery, such as hoists, compressors, &c.

A modern pumping plant, water and sewage system is to be constructed at Masontown, Pa., where a bond issue of \$25,000 for the purpose was recently voted.

The Backus Novelty Company, Smethport, Pa., is receiving figures for a two-story factory, 40 x 100 ft., which it will erect at that place.

St. Louis

ST. LOUIS, Mo., November 28, 1910.

Business continues dull on the whole, although some pretty good orders have been placed, including several pretty heavy tools. Opinion seems divided concerning the prospects, but some who watch the situation closely are satisfied that the turn of the year will see a great improvement. A great deal of general merchandise is moving, but this cannot be said to apply to the tool market. Little inquiry seems to be coming from the South, which is something of a surprise in view of the generally satisfactory agricultural situation there.

The Block-Pollock Iron Company has just installed at its scrap yard on the Oak Hill Railroad, St. Louis, a new Niles-Bement-Pond rail drill press and a Ryerson high speed friction saw.

The United Railways Company is in the market for a traveling crane for one of its power houses.

The large metal bedstead manufacturers, several being located in St. Louis, find business moving briskly, and some of them are making extensions.

Some of the trunk lines have been placing a few small orders for tools this week. On the whole there has been little stirring in the railroad department.

The Catto-Waxo Products Company, St. Louis, has been incorporated, with a capital stock of \$300,000. The incorporators are J. C. Punch, Samuel C. Punch and Montague Punch. The company will engage in the manufacture of floor sweeping compounds, &c.

The Standard Casting Machine Company, St. Louis, has been incorporated, with a capital stock, fully paid, of \$25,000. The incorporators are Marshall Fellhauer, James M. Allen, E. M. Fellhauer and L. F. Allen. The company will manufacture and construct machines for casting aluminum, bronze, &c.

The Autogenous Welding Devices Company, St. Louis, certifies to an increase in its capital stock from \$5000 to \$10,000.

The McQuade-Morris Mfg. Company, St. Louis, has been incorporated, with a capital stock, fully paid, of \$100,000. The incorporators are George S. Johnston, Wm. K. Norris, Louis E. McQuay and others. The company will manufacture automobile and machine supplies.

The Penn Central Coal Company, Jamestown, Ark., suffered a loss of \$75,000, November 11, by the burning of its engine room, coal tipples, electric light plant and valuable machinery.

The L. J. Smith Locomotive Equipment Company, Kansas City, Mo., has been incorporated, with a capital stock

of \$100,000. The incorporators are L. J. Smith, Scott Mitchell and R. C. Stripp.

The Double Mitre Mfg. Company, Kansas City, Mo., has been incorporated, with a capital stock of \$50,000. The incorporators are Frank G. Taggart, Robert L. Macey and Allen E. Macey.

Detroit

DETROIT, MICH., November 29, 1910.

Trade here continues quiet. During the past week there were few announcements of any importance. Manufacturers are, however, fairly busy, and sufficient new business is coming in from the general industrial field to keep the local plants operating well up toward their capacities, prompt deliveries usually being specified. A good deal of stock will also be accumulated within the next few weeks, as sufficient confidence is felt in the future to warrant the belief that disposition of this stock can readily be made a little later on.

The automobile trade has again become an important support to the market, but the buying is of a less spectacular character than in other recent seasons, and is done almost altogether in small lots. Factory supplies of all kinds form the most considerable item in purchases from this source. The brass foundries and shops in which finished products of brass, bronze, aluminum or other alloys are manufactured have also come into the market lately for a great deal of equipment and material, but their purchasing is likewise very quietly carried out and attracts little attention. For many of these plants further additions are being planned, but contracts for them will not be let until late in the winter.

It is reported that a syndicate headed by F. R. McMullen of Chicago has purchased the property and rights of the Interurban Light & Power Company in Mason County, and proposes to construct three dams as a part of an extensive hydroelectric development to provide power and lighting for the region around Hamlin Lake, as well as for an electric traction line to be built between Muskegon and Manistee. No plans in detail appear, however, to have as yet been worked out.

The Linderman Mfg. Company, Muskegon, Mich., is proceeding to carry out its plans for a branch factory at Woodstock, Ont., and the principal equipment will all be contracted for within the near future.

A new timber cutting plant is being installed at Soo Junction, Mich., by the Hunter & Love Lumber Company.

The Prescott Company, Menominee, Mich., will furnish the complete operating machinery for a new mill to be built next April at Masonville, Mich., by the Escanaba Lumber Company, Escanaba, Mich., and is now preparing the necessary plans.

It is reported from Big Rapids, Mich., that D. H. Vincent, superintendent of the municipal water works plant, has been directed to secure plans and estimates for an auxiliary steam plant, to be installed as a reserve for the hydroelectric equipment from which power is now derived.

The Morehead Mfg. Company, Detroit, Mich., has had a large sale this season of its return steam traps, which are now being put to service of a character that was only a short time ago considered entirely beyond the scope of such apparatus.

The American Blower Company, Detroit, has found this an excellent season for extending its foreign trade, which now forms a very considerable percentage of the total volume of business transacted.

The Light and Power Commission, Marquette, Mich., is contemplating improvements to the municipal power plant, equipped with hydroelectric machinery, which include the rebuilding of the Silver Lake dam.

The Ross & Young Machine Company has been organized in Detroit by Albert E. Young, John L. Ross and others to operate a manufacturing plant. The company is incorporated at \$35,000.

To provide for the extension of its business the Boyne City Chemical Company, Boyne City, Mich., has increased its capital stock from \$125,000 to \$500,000.

A mechanical filtration plant will be included in the plans for new water works at Flint, Mich., for which a fund of \$400,000 will soon be made available.

The construction of a new pumping plant and water works system at Harbor Springs, Mich., will begin this winter, instead of next spring as originally contemplated. Bonds for the purpose have already been sold. Machinery is to be purchased soon after the new year.

The city of Munising, Mich., is considering the construction of water works, and an engineer has been engaged to prepare recommendations and estimates.

The S. P. C. Motor Company has been organized in

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Detroit with \$50,000 capital stock by I. V. Sigsbee, W. C. Pratt and N. C. Carter.

As soon as the installation of power transformers has been completed the new hydroelectric plant of the Cleveland-Cliffs Iron Mining Company, on the Au Train River, near Ishpeming, Mich., will be put in operation. A part of the current is to be used for a paper mill and other industrial purposes, thereby broadening the market for motors and other electrical equipment in that vicinity.

The roundhouse and machine shops of the Boyne City, Gaylord & Alpena Railroad Company, Boyne City, Mich., were totally destroyed by fire on November 10.

Toronto

TORONTO, November 26, 1910.

Business shows no perceptible falling off notwithstanding that the season when cold weather usually checks operations has come round. But the fall has been an exceptionally fine and open one, the roads—except in some places—have continued good, and there has been a steady movement of trade activity from the training of grain to market to the placing of orders for all kinds of equipment. It is possible that the trade activity is being compressed, and that there will not be enough of it to last at this rate until the time comes round for starting fresh from the basis of another crop. There may be spring dullness to offset autumn briskness, but the banks seem to have no apprehension of this, for they are not sparing of accommodation to concerns that are on a good financial footing. Enlargements of demand begin to be marked on the side of pulp and paper mill equipment, flour mill plant and electrical apparatus. From the mining camps dependent on winter roads for supplies orders still come.

Canadian industrial undertakings are now receiving attention at the hands of British capitalists. Coal companies, steel companies, cotton companies, power development companies and like enterprises are much more in favor with British investors than they ever were before.

The National Iron Works, Ltd., Toronto, has doubled the capacity of its plant.

The Transit Elevator Company's new \$500,000 plant at Godwich, Ont., is now completed and in operation.

The Brown Machine Company, New Glasgow, N. S., has recently completed the erection of large new shops. It manufactures machinery used in and about the coal mines of the Province.

The Diamond Arrow Motor Car Company and the Modern Machinery Company of Ottawa are reported to have decided to join forces. To do the greater business thus arranged for, the works of the Modern Machinery Company will be greatly enlarged.

The City Council of Edmonton, Alberta, is arranging to buy a hundred acres of land to be used as the site of an industrial quarter, on which manufacturers can locate upon favorable municipal terms.

The Waterloo Mfg. Company, Waterloo, Ont., which manufactures portable engines, threshers, &c., will increase its warehouse accommodation at Portage la Prairie, Man., by the addition of a building, 70 x 136 ft.

W. R. Sweet is erecting a foundry at Cobalt, Ont.

The E. B. Eddy Company, Hull, Que., manufacturer of paper, woodenware, matches, &c., will apply to Parliament for authority to increase its capital stock to \$5,000,000.

The Atlantic Sugar Refining Company has filed plans for a refinery it proposes to build in St. John, N. B.

The McKinnon Chain Company is erecting a new plant at St. Catharines, Ont.

The Canada Forge Company, Welland, Ont., has taken up the manufacture of tool steel in addition to its other lines.

A new wing has recently been added to the building of the Springer Lock Mfg. Company, Belleville, Ont. The company has recently gone into the manufacture of various articles of builders' hardware as well as locks.

The Georgetown Coated Paper Mills is putting up a large factory in Georgetown, Ont.

North Toronto proposes to expend \$162,000 for the construction of a sewage disposal plant.

The Canadian Heating & Ventilating Company, Owen Sound, Ont., has asked the Town Council for a loan of \$20,000 to assist in financing contemplated extensions of its works. The ratepayers will probably vote on the matter in January.

The Allis-Chalmers-Bullock Company, Montreal, has secured the order for the erection of a 30 stamp plant at the Timmins mine in the Porcupine district, northern Ontario. All the machinery has to be shipped by the middle of Febru-

ary. A 20-hp. vertical boiler and a 5 x 5 in. hoist and a Cameron pump have just been shipped by the Jenckes Machine Company, Sherbrooke, Que., to the Rea Mines, Porcupine district. The Foley O'Brian Mining Company in the same camp has ordered from the Canadian Rand Company, Montreal, a four-drill compressor and two 50-hp. boilers. The Canadian Rand Company also secured the order for the large compressor at the Dome Mine in Porcupine.

The plant of the Swift Motor Car Company in Chatham, Ont., has been taken over by the Walker Motor Car Company. Additional machinery is to be put in the Chatham works. The new company has a capital stock of \$200,000.

A new steel dredge has just been launched from the Government shipyard at Sorel, Que. It will be fitted with engines to develop 450 hp. The construction of another steel dredge is to be begun at once in the yards.

E. & T. Fairbanks, Ltd., Sherbrooke, Que., is calling for tenders for the construction of buildings which, when equipped, will enable it to double its output of weighing machines, &c.

C. Whitehead, of Ely Bros., London, England, has informed the secretary of the Board of Trade at Fort William, Ont., that he will recommend that firm to establish at Fort William the assembling plant projected for the making of ammunition. It is intended to make the wads in Canada and to bring in the other parts of the ammunition made for assembling here.

The Bishop Construction Company, head office in Montreal, has been incorporated under Dominion laws with a capital stock of \$500,000.

The Canadian Mono-Rail Car Corporation, head office in Montreal, has been incorporated under Dominion laws with a capital stock of \$2,000,000.

The Eastern Pipe & Construction Company, head office in the town of Alexandria, Ont., has been incorporated under Dominion laws with a capital stock of \$50,000.

The Public Utilities Commission of Quebec Province has issued an order requiring the Montreal Street Railway Company to refrain from putting any more single truck cars in use; to reduce the number of those it has in use by 50 every year; to equip with air brakes all cars 30 ft. or more in length and weighing not less than 25,000 lbs.; to equip with emergency brakes all cars on routes with severe grades; to equip all cars with automatic mechanical drop wheel guard of Hudson & Browning type or similar; to remove the fenders after cars have been so equipped, the tripping gate also to be placed not more than 6 in. from the ground, and the apron of the wheel guard not over 5 in. The portion of the order respecting wheel guards and brakes is to apply to all electrical railways and tramways in the Province.

The Canadian Walverine Brass Company, Chatham, Ont., is about to add another building to its works.

The expanding use of electricity since the completion of a great part of the Hydro-Electric Power Commission's transmission line has brought the new Edison storage battery into prominence in Ontario.

A by-law to raise \$200,000 for water works extensions is to be voted on by the ratepayers of Vancouver, B. C., at the approaching municipal elections. This by no means provides financially for all the water works improvements the city has to make in the near future. Another sum, estimated at not less than \$700,000, will have to be expended on that account in the next year or two, and a by-law to raise this additional and larger sum is expected to be submitted later in the season.

The Elder Carriage Works Company, Toronto, Ont., has obtained a permit to erect an addition to its factory.

T. E. Reeb & Sons' foundry and automobile supply warehouse in Humberstone, Ont., was burned on November 23. Partially insured.

The Vancouver Dry Dock & Shipbuilding Company has entered into an agreement with the Dominion government to construct at Roches Point, Vancouver, a dry dock to cost \$1,214,154. The work is to be commenced within the next six months.

The Tobin Arms Company's large factory, Woodstock, Ont., is being built as speedily as possible, and so is the new building of the Eureka Planter Company there.

The Western Dry Dock & Shipbuilding Company will soon have its dry dock at Port Arthur, Ont., made to receive vessels requiring repairs.

George A. Troutt, general manager of the Van Dyke Motor Car Company, Detroit, has sent word to the municipal authorities at Ottawa that he will visit Ottawa in a few days to negotiate for the establishing of a factory there for the making of commercial motor cars.

The rate-payers of Pembroke, Ont., will vote on a by-law to raise \$65,000 to apply to water works improvements.

The McLaughlin Motor Car Company, Oshawa, Ont., is putting up a \$40,000 building in London, Ont., to be used as a warehouse and garage.

The Millar Electric Company, Chicago, has opened an

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office and factory in London, Ont., where it will make electrical heating appliances for the Canadian trade.

The Municipal Corporation of the City of Prince Albert, Saskatchewan, is applying to the Provincial Legislature for authority to construct and operate works for the development of the water power at La Colle falls on the North Saskatchewan River, to transmit and distribute the electricity there produced, and to borrow \$500,000 for the carrying out of this municipal undertaking.

The construction of the foundry that Lumby-Stenhouse, Ltd., is building at Fort William has been begun. Mr. Stenhouse is making a tour of some Canadian and American cities for the purchase of the machinery required. At South Bend, Ind., he will endeavor to secure rights for the handling of certain articles in Canada.

It is stated that the Goodyear Tire & Rubber Company, which has taken over the factory of the Durham Rubber Company at Bromanville, Ont., will make large extensions there so as to be able to employ 200 hands more by next midsummer.

Baltimore

BALTIMORE, Md., November 28, 1910.

A gradually diminishing volume of business is generally reported in the various branches of the trade associated with the iron, steel and machinery field. This is not unusual at this season, but in some instances has been more pronounced than is customarily the case. With the year end approaching buyers make only such purchases as may be absolutely needed, deferring if possible such action until after the turn of the year. In the machine tool field the demand has been particularly quiet during the past month. Occasional sales of tools of the standard type are reported, but individual transactions are small. In special machinery some little business has been done, but the demand is by no means active. There has been less general business coming from the South, although fabricators of structural material have taken a few contracts and several moderate sized buildings are being figured on. Several fair building propositions in this city are also before the trade, the most important being that for the new building for the Baltimore Bargain House. Subcontracts on a number of the buildings now under way are still held up.

Heating and ventilating engineers have been handicapped to some extent by labor difficulties with pipe fitters and helpers, who, not having their demands for higher wages granted, have been on strike during the greater part of the month. In a number of instances employers have been operating on an entirely open shop principle and obtained sufficient mechanics to enable them to keep up with the usual run of work.

There is a considerable falling off in the demand for contractors' supplies, merchants feeling the lack of demand on the part of the railroads, which were quite active buyers this time last year. Machine shop supplies and small tools have been fairly active, but transactions are confined to small lots, sufficient to run buyers up to the end of the year. Inquiries for all classes of machinery tools, power equipment, &c., have been slowly falling off and little new business of importance is expected during December.

While there has been no pronounced demand in the foundry trade, makers of castings are gradually gaining ground lost during the molders' strike several months ago, and in a number of instances are more actively engaged.

The T. C. Bashor Company has just shipped three Morrison internally fired furnace boilers, 250 hp. each, to the Metropolitan Dredging Company, New York.

The Simpson-Doeller Company, Patuxent and Preston streets, is taking estimates for a manufacturing building, 217 x 248 ft., two stories, of brick, steel and concrete construction, from plans by Otto G. Simonson. A power plant for steam and electricity is to be installed.

The Ellicott Machine Company has completed the addition recently reported to its machine shop and installed a number of new tools. No new contracts for dredging machinery of any size are reported, but the plant is fully occupied with work in hand which will keep it so engaged for some time.

Plans have been submitted to contractors for the building of the new factory of Becker Bros. & Son, Frederick and Lexington streets. The building will be of mill construction type, with concrete and steel shaving and sawdust houses, boiler, engine and machine shop departments. The mechanical equipment to be installed, and for which contracts have not been fully decided upon, includes boilers, engines, electric lighting plant, elevators and conveyors. A sprinkler system will also be installed.

The Aumen Supply & Machinery Company, W. J. O'Brien, receiver, reports a very fair demand for small tools.

That for heavy tools has been rather irregular, although some satisfactory orders have recently been booked from the United States Government. Quite a good demand for refrigeration machinery is reported and orders for several plants have recently been taken.

The contract for the boiler plant of the Hochschild-Kohn department store addition, consisting of two 250 and one 300 hp. boilers, has been awarded to the Edge Moor Iron Company, Edge Moor, Del. The contracts for the engines and for the heating and ventilating plant for that addition are understood to be unclosed.

Contractors have been invited to bid on the construction of the first section of the new building to be erected for the Baltimore Bargain House, previously mentioned. This section will be 90 x 150 ft., eight stories, and will require, it is estimated, from 2500 to 3000 tons of steel. Purdy & Henderson are the engineers. The cost of the entire new building represents an outlay of about \$1,250,000.

The Crook-Kries Company has recently installed a complete heating system in the Walbrook Station for the Western Maryland Railway. While no large contracts have been closed recently, several for heating and power installations are being figured on.

Booz Brothers have improvements in contemplation in connection with their ship repair yard. The plant is to be supplemented with a special electric double chain lifting device for service in connection with its marine railway, which will have a lifting capacity of 2000 tons. Other minor improvements are also being considered.

John D. Adt reports a good demand for special machinery and is quite busy in the various departments of the plant. An order recently taken was for six 4000-lb. capacity direct connected electric elevators, together with all appurtenances, for installation in the new buildings of the Crown Cork & Seal Company at Highlandtown, Baltimore County.

The Crook-Horner Supply Company has removed from 17-19 East Pratt street to its new warehouse, 7-9-11 Balderston street, where it will have three floors, 55 x 86 ft., for warehouse and office purposes. This concern continues as the agent for boilers, engines, pumps, supplies and general equipment formerly represented by the Crook-Horner Company, which recently retired from business.

Announcement has been made of the completion of plans for a new building to be erected on the site of the old Regester foundry and warehouse, at the corner of Holliday and Saratoga streets, destroyed some years ago by fire. The proposed building, which is to be erected for E. J. Ellinger, will be 97 x 139 ft., four stories, and will be used for general manufacturing purposes.

The Baltimore Bridge Company has taken a very fair amount of structural work during the month, both for this country and for export. Among the latter was an extension to a sugar house at Nipe Bay, Cuba, and one for two 100 and one 150 ft. bridge spans for the Northern Railway of Costa Rica. An order for one 198-ft. span and one 134-ft. span across the Erie Barge Canal near Weedsport, N. Y., has also been recently taken. Orders for work in the vicinity of Baltimore have been confined to small jobs, although several good propositions are being figured on. This concern has recently completed delivery on the structural work for the new Twenty-second Regiment Armory in New York City.

Dietrich Brothers have begun work on the new additions to their plant, briefly reported last month. The improvement consists of a five-story warehouse, 31 x 115 ft.; a three-story ornamental iron shop, 31 x 115 ft., and a one-story structural shop, 115 x 225 ft. The buildings will be of concrete, brick and steel. While contracts for some of the equipment for the shops have been placed, others are still to be decided upon. An order for a 15-ton electric traveling crane for the structural shop has been given to the Pawling & Harnishfeger Company, while orders for two 5 or 10 ton hand power cranes are still to be placed. The demand for structural and ornamental iron and steel work during November is reported lighter than in the previous month, the bulk of the business taken being of a rather miscellaneous character.

The Impervious Product Company, Fairview, Anne Arundel County, Md., is having plans prepared for the erection of a large plant. Two buildings 62 x 130 ft., one to be two stories and the other one story, are proposed, of concrete and frame construction, which will be equipped with general machinery, details regarding which are not available at this time.

Plans for the new power house for the Union Power Company, Hagerstown, Md., are being prepared by P. O. Keilholz, Continental Building, Baltimore, Md. The building will be one story, steel and reinforced concrete, 50 x 160 ft. The engineer will take bids at an early date.

The Canton Box Company, Canton, Baltimore County, Md., is having plans prepared for a two-story steel and concrete factory building 117 x 125 ft. Wilson L. Smith, Law Building, Baltimore, is making the plans.

Bids have been invited by Calvin W. Hendrick, engi-

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neer, for the erection of several concrete structures at Back River, Md., in connection with the sewage disposal plant for the city of Baltimore. The principal building will be used as a transformer station, laboratory and other purposes in connection with the operation of the plant.

Indianapolis

INDIANAPOLIS, IND., November 29, 1910.

J. J. Quinlan, 2327 North Pennsylvania street, Indianapolis, has taken out a building permit for factory and office buildings to cost \$20,000. The factory will have 35,000 sq. ft. of floor space. The buildings will be of steel and fireproof. The plant will manufacture boilers.

John C. Keller, secretary of the Evansville Business Association, Evansville, Ind., states that contracts to locate in that city have been made with a woodworking plant and an engine manufacturing company.

The Orton & Steinbrenner Company has been organized and incorporated at Huntington, Ind., with \$200,000 capital stock, to manufacture heavy machinery. The directors are P. A. Orton, H. G. Steinbrenner and E. B. Ayres.

The Commercial Club of Parker City, Parker City, Ind., has been incorporated. It will endeavor to have industries locate in that city. The directors are W. E. Baker, S. B. Keckler and Omer Clevenger.

The Midland Furniture Company has been organized at Evansville, Ind., and will build a factory to employ 200 men. Jacob Fisher, president of the Indiana Stove Works, will be president of the new company. The capital stock is \$50,000.

The American Automobile Mfg. Company of Kansas City, which recently acquired factory buildings for a plant at New Albany, Ind., expects, according to the statement of Louis A. Boli, Jr., vice-president and general manager, to begin installing machinery by December 15 and to begin manufacturing cars a month later.

Reeves & Co., manufacturers of threshing machinery, Columbus, Ind., are adding to their line a gasoline traction engine, the first of which will soon be turned out.

The Imperishable Silo Company, Huntington, Ind., has been incorporated, with \$75,000 capital stock, to manufacture silos. The directors are E. H. Baker, J. M. Tuggs and F. A. Bash.

The Peat Products Company is the correct name of the company which has built a plant at Lakeville, Ind., for the manufacture of peat. The working capacity of the plant is about 100 tons of marketable peat per day. The muck or raw peat is made into briquettes for fuel purposes, and also manufactured into fertilizer filler which contains from 3 to 5 units of ammonia and nitrogen per ton of dry material. The muck is not made into peat by a chemical process. An error was made in the item regarding this company which appeared in *The Iron Age* of October 27, referring to it as the American Peat Product Company.

The Hartman Mfg. Company, Vincennes, Ind., through its stockholders, has authorized an increase in its capital stock from \$25,000 to \$50,000, for the purpose of increasing the capacity of its plant and the extension of its business.

The court has given permission to Ben R. Mowry, receiver for the Public Service Company of Mooresville, Ind., to sell its electric light and power plant to Harry J. Stoops of Chicago for \$19,500, the amount of bonds outstanding. The receivership arose from a complaint that the company was running behind in finances.

Plans by Joseph T. Hutton, architect, have been accepted for an industrial high school at Hammond, Ind., to cost \$215,000, exclusive of the equipment. There will be a machine shop, forge room, foundry, rooms for the teaching of steam fitting, gas fitting, plumbing and electric wiring, woodworking, cabinet making and printing.

The South

NASHVILLE, TENN., November 28, 1910.

At most Southern points business thus far this month has been reported fairly good, with some orders of considerable size and enough scattered trade to make a satisfactory aggregate. The number of projects involving new construction has diminished somewhat as compared with a few weeks back; but alterations or enlargements involving the purchase of new equipment are steadily going forward in most of the leading industrial centers, including the saw milling, coal, ore and phosphate mining districts.

The Hill Power Company has been formed at Newman, Ga., by H. G. Glover and others to build a hydroelectric plant of considerable size in that vicinity.

The Shreveport Blow Pipe & Sheet Iron Works, Shreveport, La., is making a feature of blow pipe equipment for planing mills and factories, including a new patented type

of dust collectors and slow speed suction fans, piping, &c., for the removal and disposition of refuse, which in many instances is fed directly to furnaces.

The authorities at Dublin, Ga., are planning to spend \$25,000 on improvements to the city pumping plant and electric power and lighting system.

The Ware County Light & Power Company, Waycross, Ga., in consequence of changes strengthening its organization, will probably increase its equipment materially during the coming year or two.

The Brown Wagon Company, Macon, Ga., is arranging for a thoroughly modern system of electric motor drive and will purchase current from a central power station.

It is proposed at Douglasville, Ga., to build an electric power and lighting plant for operation by the municipality.

The construction of a municipal power and lighting station has been decided upon at Midway, Ky.

The Southern Engine & Boiler Works, Jackson, Tenn., has had a continuously good business this season in the equipment of power plants, particularly for saw mills, the operating machinery of which it also furnishes.

The Electric Power & Mfg. Company, Spartanburg, S. C., is planning a large increase in power equipment and the extension of its service to other communities.

A bond issue to cover the cost of a municipal power plant was defeated at Americus, Ga., but another election will be held on the subject in the near future.

The Richmond Power Corporation, organized at Richmond, Va., proposes to build a large electric plant at the Midlothian coal mines and supply current to that city for lighting and industrial power.

Specifications for machinery to be installed in the proposed electric power and pumping plant for municipal service at Chase City, Va., will be complete and ready for bids about the first of the year.

Considerable new machinery, including a large electric crane, will be installed in the mills now under erection by the Appalachian Marble Company, Knoxville, Tenn., in the suburb of Lonsdale. A part of the equipment, however, will be taken from another plant.

The Consolidation Coal Company, Baltimore, Md., which recently acquired 100,000 acres of coking coal lands in eastern Kentucky, will begin at once the construction of a large coking plant, to be situated on Boone's Fork, in the center of the Elkhorn coal field. The Chesapeake & Ohio and the Louisville & Nashville railroads are building tracks into the property.

Chess Wymond & Co., Louisville, Ky., have leased land in Harrison, Miss., for the term of five years, and are erecting a mill for the manufacture of staves.

Fire at the Jackson Cotton Oil Company's plant, Jackson, Miss., destroyed the hull house, causing a loss of about \$15,000.

The Georgia School of Technology, Atlanta, Ga., is preparing to erect an administration building and a foundry and smith shop. The company has machinery enough to equip the addition, but later on will add machine shop and woodworking shops, which will call for the purchase of machinery in that line.

The Northwest

MINNEAPOLIS, MINN., November 28, 1910.

From this time forward until the opening of another season of navigation, there will be considerable activity at the ports on Lake Superior, and all through the iron ranges, in preparing for next year's work; and extensions or improvements are already being blocked out that call for the purchase of a great deal of material, including power, mining and other mechanical and electrical equipment of every description. In the region north of Duluth there will also be numerous installations of municipal plants for water works and lighting service, so that, taken all together, an exceptionally busy period is in prospect for manufacturers and supply houses interested in this trade. Through southern Minnesota and the Dakotas no great degree of activity is promised until the revival of construction work in the spring; but many plans are now being made that will result in much new building at that time. In the mining districts of the Black Hills and west into Montana and Idaho, there will also be need of a great deal of new equipment, a considerable percentage of which will be ordered between January 15 and March 1, so as to insure delivery in time for early installation in the spring.

The Gunther Machinery Company, Minneapolis, among recent contracts, has furnished the complete operating equipment of the new planing mill built in Minneapolis by the H. B. Waite Lumber Company.

An ore concentrating mill and cyanide plant will be built in the spring on People's Creek by the Regal Mountain Coal Mining Company, Great Falls, Mont. Either steam pump

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equipment will be provided or electric current obtained from a water power that has been developed in the vicinity.

The Frick & Browick Granite Company, St. Cloud, Minn., has been organized by O. Frick and others to establish a granite working plant.

An order for three Pelton water turbines, each direct connected to a Westinghouse generator of 2000 kw. motor generator sets, power transformers, &c., has been placed by the Homestake Mining Company, Lead, S. D., for the equipment of its hydroelectric plant. Accessory apparatus will be purchased as the work nears completion.

The Black Hills Development & Financial Corporation will enter upon the construction next spring of a 300-ton ore reduction plant, including smelter, at Carbonate, S. D. The plans also call for the installation of a large electric power plant in the coal fields of Wyoming, which are just across the State border.

The city of Harlowton, Mont., has engaged C. M. Thorp of Bozeman, Mont., to prepare plans for the new water works plant to be constructed there.

The installation of a municipal power and lighting system is under consideration at Eureka, S. D.

John I. Moore, Minot, N. D., has been granted a franchise by the village of Berthold, N. D., for the construction and operation of an electric light plant. It is to be ready for operation by February 7.

The Minneapolis & St. Louis Railroad Company has completed an addition to its roundhouse at Watertown, S. D., in which are installed a drill press, lathe, shaper, blacksmith forge and a boiler for heating the roundhouse and operating power. The addition is 24 x 72 ft.

The Denver, Laramie & Northwestern Railroad Company, Denver, Colo., is constructing a four-stall roundhouse and machine shops 25 x 80 ft. on its terminal grounds, the latter to contain sufficient machinery to handle its motive power and car repair work.

Milwaukee

MILWAUKEE, WIS., November 28, 1910.

While some houses report a marked improvement on sales within the past fortnight, the machinery market here, so far as local or State requirements are concerned, continues generally dull and the bulk of the business obtained by the larger manufacturing plants comes from remote districts of the country. Other orders are mainly of a routine character and cover small equipment or supplies, including repair parts. A great many lists are being figured on and eventually they will nearly all be booked, but intending buyers are putting off the actual closing of contracts just as long as they feel that they can do so without injuring their business.

The above applies to machinery in general. Local builders of shop tools have not had facilities to fully take care of the demand for their products, and until these are provided by the new buildings now under erection there is little that can be said concerning this branch of local manufacturing. Sales of equipment for use in Milwaukee and vicinity are principally in the hands of representatives of outside concerns. Some of these appear to be doing quite well, but the majority find trade slow. Out in the State the situation is rather better.

The boilers now in use in the municipal pumping plant at Stoughton, Wis., are expected to be condemned, and steps will be taken at once to provide a new battery.

A boiler house extension 47 x 64 ft. will be erected at the municipal power and pumping station in Bayfield, Wis., and two new boilers provided. The work, however, is not to be started until spring.

A substation equipped with power transformers and other apparatus will be installed in Bloomer, Wis., by M. Rasmus, proprietor of the local electric plant, to take current from a transformer line connected with the plant of the Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.

Business interests at Waukesha, Wis., are planning the erection of a gray iron foundry, which, it is stated, will be occupied by the I. B. Powell Company, Menominee Falls, Wis., which is said to have decided upon removing from its present location.

The Heib Mfg. Company, Merrill, Wis., instead of building a new factory to replace the one destroyed by fire, will probably purchase an existing plant in that vicinity and remodel it for the installation of thoroughly modern equipment.

Pumping machinery is to be installed and a complete system of water distribution constructed for the city of Prescott, Wis.

It is probable that a large factory will be built in Sheboygan, Wis., by the Sagerstrom Piano Company, now lo-

cated at Minneapolis. The Business Men's Association of Sheboygan now has under consideration the securing of a suitable site for the purpose.

A factory, with modern equipment, including boilers, pumps, vacuum pans, power machinery, &c., is to be erected at Clinton, Wis., by the Delavan Condensed Milk Company, Delavan, Wis.

The Berlin Machine Works, Beloit, Wis., furnished the complete operating equipment of the large new planing mill and woodworking plant constructed at Call, Texas, to replace a plant that burned early in the fall. This installation was made in record time, the new mill having been put in operation within 40 days from the time the old one was destroyed.

The Oneco Copper Mining Company, Houghton, Mich., is developing a shaft in which operations had been abandoned for some years past and is replacing the old equipment with heavier machinery secured from another mining company. A considerable line of purchases of new apparatus for the account of this property will need to be made at intervals during the coming year.

A portable rip and swing crosscut sawing rig for construction work and general industrial service is being put on the market by the Oshkosh Logging Tool Company, Oshkosh, Wis. It can be operated, either by gasoline engine or electric motor, or belted to an existing source of power.

It is reported from Antigo, Wis., that a manufacturing plant of moderate initial capacity will be built there by the National Hoist Company, which was recently organized by C. F. Dallman and others.

The proposition to issue bonds for \$300,000 to cover the cost of a new water works system, with high duty pumping engines, and a municipal electric plant at La Crosse, Wis., was defeated at the recent election, but will be revived.

Forge and machine shops for repair work are to be built in the spring at Whitewater, Wis., according to the present plans of the Badger Railway & Light Company, Milwaukee, which expects to begin construction at that time of a direct line to connect Whitewater and Lake Geneva. It is also proposed to establish an electric generating station at Whitewater sufficient to provide current for local power and lighting service. Machinery requirements, however, will not be figured upon for some time.

The Mosinee Electric Company, Wausau, Wis., whose organization was recently noted, will not only operate a public service plant at Mosinee, Wis., but also deal in electrical machinery and appliances, particularly motors, controllers, switchboards, &c.

The Wilton Light & Power Company, Wilton, Wis., has been granted a franchise to construct a light and power plant.

The Southwest

KANSAS CITY, MO., November 28, 1910.

In comparison with the amount of business entered from day to day the number of inquiries upon which salesmen are working has largely increased, indicating that there are a great many orders to be placed during the winter months. Delay in closing contracts still characterizes the market, and the spurt of buying that occurred immediately following the election has given way to a period of relative quiet.

M. Cook & Co., Joplin, Mo., have been engaged by the city of Granby, Mo., to prepare plans for a municipal water works system which will include high duty pumping units.

Plans and specifications for a municipal pumping plant at Malvern, Ark., are expected to be worked out some time this winter.

The construction of a municipal water works system has been definitely decided upon at Fairfax, Okla.

A boiler, steam pump and hoist have been installed by W. T. Henderson, Neosho, Mo., at a new mining property in Henderson, Mo., and other machinery will be required as soon as the development warrants it.

The Webb City & Cartersville Foundry & Machine Works, Webb City, Mo., is featuring in its sales at present an improved ore screen of the Henry type which is notable for the very accurate sizing that it performs, as compared with ordinary machines for the purpose.

A fully equipped machine shop is being erected by the Inspiration Copper Company, Miami, Ariz., adjacent to its main works, to provide for the necessary repairs to the operating machinery.

The machinery equipment of the Arkansas Stone & Iron Company's quarry and crushing plant at Imboden, Ark., which was recently bought by Julius Haugh of Decatur, Ind., will be enlarged and improved.

The Arizona Mine Supply Company, Prescott, Ariz., has been awarded the contract from the Grand Mountain Mining Company for the machinery equipment of a group of mines to be developed at Chaparral, Ariz.

THE MACHINERY MARKETS

The Scott Mfg. Company which is building a modern furniture factory at Helena, Ark., will in future be one of the most important buyers in that section of mechanical equipment and supplies.

The installation of a water works system will probably be undertaken next spring at Braymer, Mo., where the subject is now under consideration by the authorities.

Power machinery, pumping units, piping, &c., will be required by the Alfalfa Irrigation Company, Altus, Okla., which is undertaking an extensive development in that vicinity.

A large band mill with auxiliary equipment is being installed in the plant of the West Lumber Company, Westville, Texas, and other improvements are to be made later on.

H. L. Kramer, Galena, Kan., is removing the machinery from his mill to a new ore concentrating plant in Cave Springs, and will install additional equipment.

Provision will be made in the near future for the purchase of machinery with which to equip a new municipal power and pumping plant at Stafford, Kan., plans and specifications for which were recently completed.

The Taylor Water Company, Taylor, Texas, has under consideration at the request of the city the installation of a larger pumping unit at its San Gabriel River station.

The J. S. Worley Company, Kansas City, is preparing plans for the construction of a pumping plant and system of modern water works at Altoona, Kan.

The business of the Hannibal Wagon Company, Hannibal, Mo., has been incorporated with \$55,000 capital stock. The company is contemplating the erection of an addition to its plant in the spring, details of which have not been decided upon.

The Jewel Carriage Company, Carthage, Mo., has increased its capital stock from \$250,000 to \$400,000. The new issue will be preferred stock and will be used for enlarging the plant and extending the business.

The Osage Welch School Desk & Furniture Company will build a plant at Osage, Okla., which will include a main building, 75 x 125 ft.; warehouse, 60 x 90 ft.; dry kilns, 25 x 90 ft., and an engine and boiler room, 30 x 40 ft. It is expected to have the buildings constructed and equipped by January 15.

Farther Central West

OMAHA, NEB., November 28, 1910.

A feature of the existing situation which causes considerable dissatisfaction among manufacturers, dealers and sales agents who depend upon the regular machinery trade of this section is the frequent change of plan, postponements, &c., on the part of prospective purchasers. Last spring many of them who had decided upon new construction or improvements announced that these would be undertaken before the close of summer. Then they put off doing anything until the trend of fall business could be observed, and now they are talking about what they will do the last of the winter or at the beginning of spring. Meanwhile, large lists of equipment have been quoted upon and the salesmen of various houses are kept guessing as to when their services will be required in closing contracts. They are afraid to devote less attention to prospects than they have been giving them, as competitors may step in and take advantage of the work already done; other business that might be secured with proper effort, but promises less returns, is frequently neglected in consequence. Under the circumstances it is essentially a dealers' market, and the most profitable line of trade is comprised in minor equipment and supplies.

The purchase of machinery and other equipment included in plans for improvements to the local water works and electric lighting system will be made shortly after January 1 at Grand Island, Neb., by the city authorities.

A machine shop for repair work will be installed by the Iowa City Electric Railway, Iowa City, Iowa, in connection with other extensions and improvements.

The contract for the portion of the equipment to be used in the new lighting system at Fremont, Neb., including metal poles, will be furnished by the Fremont Foundry & Machine Company.

The installation of a pumping plant and water distribution system is proposed at York, Neb., and a bond issue for the purpose will be voted upon December 27.

A large fireproof warehouse, with handling equipment, will be built in the spring by the Leighton Supply Company, Fort Dodge, Iowa.

The Katz-Craig Company, Omaha, has the contract for a new water works system for Belle Fourche, S. D.

The Alamo Engine & Supply Company, Omaha, has been awarded the contract for installing an electric power plant for the city of Blue Hill, Neb.

Plans are now under consideration by the authorities at Brigham City, Utah, for the installation of a hydroelectric power unit, consisting of a hydraulic turbine of the reaction type and an alternating current generator.

The construction of an electric plant to be operated by the municipality is under consideration at Franklin, Neb.

The municipal power and lighting plant at Seymour, Iowa, which was destroyed by fire, will be rebuilt for greater capacity. The old equipment included a Westinghouse generator driven by a Murray Corliss engine.

It has been decided that the repair shops of the new electric railway line to be built by the Iowa Traction Company from Oskaloosa to Tama, Iowa, will be located at the former place.

The Fremont Gas & Electric Light Company, Fremont, Neb., has let the contract for a new building, 30 x 80 ft.

The Tungsten Mountain Mines Company, Boulder, Colo., is about to install an air compressor, which will be operated by an electric motor. Additional machinery will be purchased as work progresses on a tunnel which the company is now driving.

It is reported that the Des Moines Electric Light Company, Des Moines, Iowa, is considering improvements to its plant amounting to about \$70,000.

The plant of the Ottumwa Supply & Construction Company, Ottumwa, Iowa, was destroyed by fire November 19. The building was owned by the Milwaukee & St. Paul Railroad.

The Gade Company, Iowa Falls, Iowa, is not only erecting its new gate factory building, but is putting up the west half, or 150 ft. of its new gas engine factory. The company will build the east 150 ft. in the spring.

Southern Texas

AUSTIN, TEXAS, November 25, 1910.

The demand for structural steel is keeping up well in Texas and the Southwest generally. In the larger cities plans are being drawn for a number of large office and factory buildings, the erection of which will be carried out during the coming year. The influx of new settlers to south Texas, particularly in the Gulf Coast and lower Rio Grande valley regions, is creating an increased demand for irrigation machinery. It is reported by dealers in pumps and engines and irrigation supplies generally that their trade this fall has been much the largest they have had in the same season. It is usually during the winter that the installation of irrigating plants is carried on most actively.

Instead of removing his canning factory from Madison, Ind., to San Benito, Texas, as was originally proposed, N. J. Hitz will install a new and modern plant at the latter place. It will be one of the largest canneries in the South. The main building will cover an area 300 x 365 ft. Employment will be given at the start to about 150 people.

The Crockett machine shop at Bay City, Texas, has been purchased by Charles Le Sage and Andrew Bentham. The shop is equipped for both iron and woodworking. New machinery will be installed.

The San Antonio Machine & Supply Company, San Antonio, has been awarded the contract by the Brownsville Sewerage Company, Brownsville, Texas, for the machinery for the sewerage disposal plant at that place.

The carriage works of A. Ferrell & Sons, Dallas, recently destroyed by fire, will be rebuilt. The loss was about \$25,000, partly insured.

The Mexico Northwestern Railway Company is negotiating for the necessary ground in El Paso upon which to construct an extensive terminal system. The present northern terminal of the road is Juarez, Mexico, opposite El Paso. A large amount of money will be invested in the improvements.

The Ysleta Townsite Company has adopted plans for the establishment of a new town near Ysleta, Texas. The irrigation of a large tract of land is embraced in the proposed enterprise.

The Board of Trustees of Deming, N. M., has ordered an election to be held January 14, for the purpose of voting on the proposition of issuing \$38,000 of bonds for the construction of a sanitary sewerage system and sewerage disposal plant. The system will consist of one septic tank, five standard flush tanks and 900 standard manholes. About 37,000 ft. of sewer pipe will be laid.

Domingo G. Aguirre, Sucs., will construct a complete and modern system of water works for the city of Tepic, Mexico. About \$200,000 will be invested in the pumping plant and distributing system. The plans for the proposed works are now being drawn.

The Fundicion Hidalgo, Monterey, Mexico, will make important enlargements of its iron works in that city. It

will add a department for the manufacture of chilled car wheels and will also install machinery for manufacturing all kinds of bearings for line shafting. At present all chilled car wheels and bearing boxes come from abroad.

E. L. Kelley, Beeville, Texas, has admitted into partnership A. J. Hays of Papalate, Texas. The new concern will be known as the Beeville Cornice Works. New machinery will be installed and a large stock of material carried in future.

Iron and Industrial Stocks

NEW YORK, November 30, 1910.

The stock market at last yielded to the influence of the continued unsatisfactory reports regarding general trade, doubtless accelerated by the pessimistic utterances of James J. Hill of the Great Northern Railroad. Prices therefore sharply declined until Tuesday afternoon, when a rally occurred after the announcement of the Pennsylvania Railroad's rail orders for 1911. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.....	8%	Railway Spr., pref.	96 1/2 - 97%
Allis-Chalm., pref.	31 1/2 - 33	Republic, com.....	33 - 34 1/2
Beth. Steel, com.....	30 1/4 - 32 1/2	Republic, pref.....	96 - 97
Beth. Steel, pref.....	59 1/4 - 62 1/2	Sloss, com.....	49 1/4 - 52
Can. com.....	9 1/2 - 10%	Sloss, pref.....	114 1/2 - 115 1/2
Can. pref.....	77 - 82 1/2	Pipe, com.....	17 1/2 - 18 1/2
Car & Fdry., com.....	51 - 55	Pipe, pref.....	58 1/2 - 59 1/2
Car & Fdry., pref.....	115 - 116 1/2	U. S. Steel, com.....	76 - 80 1/2
Steel Foundries.....	46 - 47 1/2	U. S. Steel, pref.....	117 1/2 - 118 1/2
Colorado Fuel.....	31 1/2 - 35 1/2	Westinghouse Elec.	87 - 78 1/2
General Electric.....	154 1/2 - 160	Am. Ship, com.....	77 1/2 - 78
Gr. N. ore cert.....	57 1/2 - 59 1/2	Am. Ship, pref.....	110 1/2 - 111
Int. Harv., com.....	110 - 113	Chi. Pneu. Tool.....	40 - 42
Int. Harv., pref.....	121 1/2 - 122 1/2	Cambria Steel.....	43 - 44 1/2
Int. Pump, com.....	42 1/2 - 44 1/2	Lake Sup. Corp.....	26 - 27 1/2
Int. Pump, pref.....	84 1/2 - 86 1/2	Pa. Steel, pref.....	104 1/2 - 105 1/2
Locomotive, com.....	37 1/2 - 40 1/2	Warwick.....	10 1/2 - 11 1/2
Locomotive, pref.....	106 1/2 - 107 1/2	Crucible St., com.....	12 1/2 - 13 1/2
Pitts. Steel, pref.....	100 1/2 - 101 1/2	Crucible St., pref.....	78 1/2 - 79 1/2
Pressed St., com.....	32 1/2 - 33	Harb.-W. Ref., com.	32 1/2 - 33 1/2
Railway Spr., com.	33 1/2 - 34	Harb.-W. Ref., pref.	94 - 95

Dividends.—The Ingersoll-Rand Company has declared the regular semiannual dividend of 3 per cent. on the preferred stock, payable January 1.

The Underwood Typewriter Company has declared the regular quarterly dividend of 1 1/4 per cent. on the preferred stock, payable January 2.

Notes on Prices

Rope.—Business in cordage is moving along in the same fashion as for some time, the demand being fair, but not up to the wishes of manufacturers. The lower prices quoted last week were about what rope had previously been selling for, as the result of concessions from card prices, but which had not been formally announced. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8 1/4 to 9 1/4 cents per pound; second grade manila, 7 1/4 to 8 1/4 cents per pound; hardware grade, 7 1/4 to 7 3/4 cents per pound; pure sisal of the highest grade, 6 1/2 cents per pound; second grade, 6 1/4 cents per pound; jute rope, 1/4-in. and up, No. 1, 5 1/4 to 6 1/4 cents per pound; No. 2, 5 1/4 to 5 3/4 cents per pound.

White Lead in Oil.—The demand for white lead in oil has fallen off as usual at this season, but notwithstanding this there was a fair business during November both in jobbing lots and making shipments on contracts. October held its own as the banner month of the fall trade. Prices remain unchanged for the best brands in New York as follows: In lots of 500 lb. and over, 7 1/2 c. in 100, 250 and 500 lb. kegs; 7 1/4 c. in 25 and 50 lb. kegs. In lots of less than 500 lb. lots the usual advance of 1/2 c. is charged.

Linseed Oil.—The cause of the reduction in the price of oil last week was because the price of Argentine flax seed laid down at Western points was lower than domestic seed was selling for, and this resulted in the price of domestic seed falling off in price. The seed situation has resulted in some speculative buying of oil, but outside of this, demand is somewhat above the average for the season, as manufacturing consumers have not stocked up as in previous years. The following quotations represent New York prices in five-barrel lots or more:

State, raw.....	Cents. 94
City, raw.....	95
Linseed, in lots less than 5 bbl., 1 cent advance per gallon.	
Bolled oil, 1 cent advance over raw.	

Spirits Turpentine.—In the local market the demand continues for comparatively small lots, but these aggregate quite a considerable movement. This is accounted for by the fact that paint manufacturers did not supply themselves with turpentine earlier in the season on account of the high price, so that buying is being extended through the usual dull season. Continued buying may result in higher prices as the supply decreases. New York quotations in five-barrel lots are as follows:

In oil barrels.....	Cents. 78
In machine barrels.....	78 1/2
Less than 5-bbl. lots, 1/2 cent advance per gallon.	

The Lehigh Valley Structural Steel Company

The Lehigh Valley Structural Steel Company held a house warming on the evening of November 22 in the new office of its plant at the foot of Allen street, Allentown, Pa. The company started business in May in what was formerly the roll and beam mill of the old Allentown Rolling Mills. The building was in bad condition when occupied, but it has been put in good shape, and the original space intended for the plant is already being doubled. The equipment is provided to handle the heaviest and largest structural steel work, the entire plant being electrically driven. From the time operations were begun until now the company has been extremely fortunate in securing business, and its prospects are reported most excellent for a continuance of trade.

The officers are as follows: President, Dixon C. Williams of Chicago; vice-president and general manager, F. S. Komp; treasurer, Joseph Mack. President Williams is vice-president of the Chicago Building & Mfg. Company, Chicago Nickel Company, Chicago Pump Company, and interested in other Chicago enterprises. Vice-President Komp, who is in direct charge of the plant, has had much Western experience, and for the last few years has occupied a similar position with the Modern Steel Structural Company, Waukesha, Wis. The foreman of the plant is William McGonnigan, who was formerly in charge of the Allentown Rolling Mills plant and has also been connected with the Bethlehem Steel Company and the Guerber Engineering Company.

Scrap Iron Dealers Organize for Protection

The Western Scrap Iron Dealers' Protective Association has been formed, with headquarters in Chicago. The secretary is Isadore Wagner, 745 West Thirty-ninth street. The organization was effected at a meeting held last month, which was attended by 36 dealers from towns in Illinois and Wisconsin. As stated in the constitution, the objects of the association are: "To promote the business of dealing in scrap iron and metals; to secure the co-operation of persons engaged in the scrap iron and metal business for a legal uniform system of transacting business; to protect and preserve the welfare of persons engaged in said lines of business, and to take all legal steps for the mutual protection of the interests of all persons engaged in the scrap iron and metal business and to aid and assist all members in good standing in prosecuting and in defending any unjust claims that may be made against them by any of their customers, and to secure the usage of a reasonable uniform contract to be used in connection with the sales of the merchandise of the members." The membership fee is \$25. The plan is meeting with much favor, dealers in that section of the country enrolling their names rapidly.

The Norton Company, Worcester, Mass., announces that Charles Churchill & Co., Ltd., of London, Birmingham, Manchester, Newcastle and Glasgow, have been appointed sole agents for the United Kingdom for Norton grinding wheels made of alundum. It is nearly 20 years since Charles Churchill & Co. entered into business relations with the Norton Company for the sale of its wheels, and it is especially gratifying to the firm that it should now be intrusted with the handling of the whole of the company's business in such an important territory.

The Alice Furnace, at Birmingham, Ala., and No. 4 of the Ensley group of the Tennessee Coal Iron & Railroad Company were blown out November 28. The Southern Iron & Steel Company is expected to blow in its Alabama City furnace this week.

The Steel Corporation's Pension System

Plans have now been consummated to begin on January 1, 1911, to make payments from the United States Steel and Carnegie Pension Fund, which was established last spring by the joint action of the United States Steel Corporation and Andrew Carnegie. From the income of the fund old age pensions will be paid to employees of the United States Steel Corporation and its subsidiary companies. For this purpose the United States Steel Corporation provided \$8,000,000 which, with the Carnegie Relief Fund of \$4,000,000 created by Andrew Carnegie on March 12, 1901, makes up a joint fund of \$12,000,000. The fund is administered by a board of 12 trustees, through a manager appointed by the board, with such powers and duties as the board may give him. The Board of Trustees has adopted pension rules for the administration of this fund to take effect on January 1, 1911, and apply to persons who are in the service of the United States Steel Corporation and its subsidiary companies on and after that date. Three classes of pensions are provided:

1. Pensions by compulsory retirement, granted to employees who have been 20 years or longer in the service and have reached the age of 70 years for men and 60 years for women.
2. Pensions by retirement at request, granted to employees who have been 20 years or longer in the service and have reached the age of 60 years for men and 50 years for women.
3. Pensions for permanent incapacity, granted to employees who have been 20 years or longer in the service and have become permanently totally incapacitated through no fault of their own.

The monthly pensions to be paid from the income of the fund will be made up on the following basis: for each year of service, 1 per cent. of the average regular monthly pay received during the last 10 years of service; provided, however, that no pension shall be more than \$100 a month or less than \$12 a month. For example, an employee who has been 25 years in the service and has received an average regularly monthly pay of \$60 a month, will receive a pension allowance of \$15 a month.

This pension fund provides for the support of faithful employees in their old age. It is entirely separate and distinct from the voluntary accident relief plan put into operation by the United States Steel Corporation on May 1, 1910, which provides for employees who may be injured and the families of employees who may be killed while at work in the service of the subsidiary companies of the United States Steel Corporation.

Neither the voluntary accident relief plan nor the United States Steel and Carnegie Pension Fund involves any contribution from the men themselves toward the accident relief or old age pensions.

Republic Improvements.—The Republic Iron & Steel Company, Pittsburgh, is about to let contracts for the immediate building of a 16-in. continuous roughing and a 14-in. finishing mill to be installed in its Brown-Bonnell Works at Youngstown, Ohio. These mills will roll merchant steel bars from 1 to 3 inches in diameter and equivalent shapes. No. 4 blast furnace, under construction by the Republic Company at Haseltown, is expected to be ready about April 1, and the new open-hearth plant, which will contain eight 60-ton open-hearth furnaces, about May 1.

The Vanadium-Alloys Steel Company, Latrobe, Pa., manufacturer of high speed, alloy and carbon steels, has recently installed and put in operation a 12-in. rolling mill driven by electric motors. It is stated this mill is the only one of its kind rolling high-speed steel that is driven by electricity.

Labor Notes

At Los Angeles, Cal., it is now stated that all the foundries whose men were on strike this year are supplied with men, and there is some difficulty in placing all the nonunion workmen who desire positions. Pickets are still on duty about some of the shops, but the Supreme Court has decided that the anti-picketing ordinance passed by the City Council of Los Angeles is legal. Some 280 pickets are now awaiting trial under this ordinance, half of them being out under bail.

Efforts are being made to strengthen the International Molders' Union in Portland, Tacoma, Seattle and Spokane, and the Pacific Coast machinists are looking to the molders to help them in their strike.

The semi-annual meeting and banquet of the Washington district of the United Metal Trades Association of the Pacific Coast was held in Seattle November 16. The question of reducing hours under a lessening volume of business was discussed, and it was the general sentiment that shops should not work less than nine hours a day, as any reduction of hours at this time would be considered as yielding to the demand of the union for a shorter workday. It was urged that if work became slack it would be better to lay off men for a day or two than to work all the week on less than a nine-hour basis. An instance was cited in which hours were reduced in a shop due to the falling off of orders, and the unions immediately sent out the report that this particular shop had signed for the eight-hour day.

The West Penn Steel Company, Brackenridge, Pa., maker of open hearth steel and black and galvanized sheets, has decided to add a 32-in. jobbing mill to its equipment, on which heavy sheets and light plates up to 60 in. wide will be rolled. To accommodate this new mill an extension to the present main mill building, 80 x 100 ft., will be added, making this building 80 ft. wide and 600 ft. in length. The contract for the mill will likely be placed within a few days. No additional equipment will be needed, the present power plant being sufficiently large to drive the new mill.

Much interest is manifested at Birmingham, Ala., in the proposition to merge a number of the producers of pig iron into one large corporation. It is admitted that a strong combination could be worked up; but, generally speaking, there is felt but little hope of bringing about such a consolidation. Still, the fact that the high officials of three of the principal concerns involved have been going over the district in private cars the past week, looking carefully over the different properties involved, undoubtedly lends color to the scheme.

The Society of Automobile Engineers will hold its next annual meeting in New York City January 11 and 12, during the Automobile Show. Among the papers to be presented are the following: "Automobile Springs," by E. K. Rowland, of Wm. & Harvey Rowland; "Motor Tests," by Prof. R. C. Carpenter; "Gears with Rolled-in Teeth," by H. N. Anderson.

Mary Furnace of the Ohio Iron & Steel Company at Lowellville, Ohio, which has been closed down since June 1, will not resume blast until market conditions improve, both as regards the demand for pig iron and prices. It is announced on the highest authority that the company will not build an open-hearth steel plant during 1911 as reported.

The Bethlehem Steel Company has removed its Philadelphia offices from the Pennsylvania Building to Suite 1609 Morris Building, 1421 Chestnut street.

Trade Publications

Stopping Drills.—The Denver Rock Drill & Machinery Company, Eighteenth and Blake streets, Denver, Colo. Bulletin No. 8-C-2. Illustrated. Concerned with the Waugh stopping drill, in which no air escapes from the front end, thus making it practically dustless. Other special features of construction are a machinery steel valve chest with a hardened steel bushing to form the valve seat, an automatic lubricating device and the use of an improved type of barrel. While practically any shape of steel can be used for drilling, the one recommended is the four-grooved section.

Fine Tools.—The L. S. Starrett Company, Athol, Mass. Catalogue No. 19. Size $5\frac{1}{4} \times 7\frac{1}{2}$ in.; pages, 274. Describes and illustrates a very complete line of fine mechanical tools, which includes a number that have been added since the previous edition was published. Brief specifications are given, and a number of tables of useful information completes the catalogue. The customary system of marginal numbers has been retained and both numerical and alphabetical indices render it a simple matter to locate any tool quickly.

Blowers.—Sterling Blower Company, Hartford, Conn. Catalogue No. 85. Concerned with a number of blowers and blower systems for handling refuse and dirt from various mechanical processes, conveying light material and removing steam and odors. The various parts of these systems are illustrated and described.

Head Gates, Gate Hoists and Valves.—S. Morgan Smith Company, York, Pa. Bulletin. The first part contains photographs of head gates, gate hoists and valves, with a brief description of each, while in the last part are dimensioned drawings of hoists, made so that they can be readily used by engineers and draftsmen. There are also five pages devoted to turbine lay-outs.

Annunciators and Push Buttons.—De Veau Telephone Company, 472 Eighteenth street, Brooklyn, N. Y. Catalogue No. 14 and a pamphlet. The former describes a full line of telephone apparatus and electrical specialties. Separate systems are shown accompanied with installation specifications, suitable for engineers, architects or contractors. Among the specialties is an electric reset annunciator, with the drop operating in any position and remaining where put. Besides this there is a new gravity annunciator, so constructed that it is impossible to shake down the drop. The pamphlet contains short descriptions of annunciators and push buttons.

Outlet Boxes and Covers.—Pratt Chuck Company, Frankfurt, N. Y. Booklet. Describes galvanized boxes and covers for electric fixtures of various types. The covers are self-adjustable and can be removed without taking out the screws.

Well Drilling Machinery.—The Cyclone Drill Company, Orrville, Ohio. Catalogue A-50. Size $6\frac{1}{4} \times 9\frac{1}{2}$ in.; pages, 128. Describes and illustrates the company's complete line of well drilling and prospecting machinery, showing some new type of drills not brought out in former catalogues. Views are also given of the company's plant in 1893 and its present one, showing the growth. Interior views of the various departments of the plant are also shown. Net prices are given on tools and supplies.

Pumping Machinery.—Boggs & Clarke, 535 South Clinton street, Syracuse, N. Y. Pamphlet. Concerned with a line of centrifugal pumps, winches, crushers and general machinery. The pumps include vertical and horizontal types, horizontal suction pumps, horizontal and vertical double suction pumps and steam centrifugal pumps. The different pumps are illustrated and brief tables of specifications are given. Space is also given a number of accessories, such as check and float valves, a foot valve and strainer and pipe and fittings. Other pieces of machinery illustrated include a patent ice crusher and a changeable and adjustable winch, which can be used on legs in the ordinary way, on a post or placed on the body of a wagon or car.

Steam Pumps and Hydraulic Machinery.—The Canton-Hughes Pump Company, Canton, Ohio. Catalogue No. 25. Size $7\frac{1}{4} \times 5\frac{1}{4}$ in.; pages, 120. Lists the duplex and simplex piston and plunger pattern pumps, which are most commonly used. While those illustrated are numerous, there are a large number of other pumps which the company builds and which it is prepared to furnish in response to requests for special designs. Tables of specifications supplement the illustrations and a telegraph code and considerable useful information complete the catalogue.

Cold Tire Setter.—The Brooks Tire Machine Company, Wichita, Kans. Booklet. Deals with the Brooks cold tire setter, which is a hand power machine for upsetting tires cold while on wheels. The special features of this machine are described and the text is supplemented by illustrations of the various parts. Four sizes of machines in all are built, handling tires from $\frac{3}{4}$ in. thick \times $1\frac{1}{4}$ in. wide to $\frac{3}{4}$ in. thick and $4\frac{1}{4}$ in. wide.

Oil Stones.—The Scranton Whetstone & Abrasive Wheel Company, Scranton, Pa. Loose leaf catalogue. Pertains to

the line of Ideal oil stones, made of an electric abrasive, which is said to be as hard and sharp as a diamond. The different styles illustrated include sharpening and slip stones, combination bench stone, gouge stones with round edge, pocket and axe stones, and oil stones for a number of different purposes. Space is also given to various kinds of emery wheels and cylinders and there are a number of line engravings showing the special wheels supplied for various makes of grinding machinery.

Mechanical Rubber Goods.—The B. F. Goodrich Company, Akron, Ohio. Catalogue. Size 6×9 in.; pages, 171. Pertains to the line of mechanical rubber goods manufactured by this company, which includes rubber belting, hose in a number of varieties, gaskets and railroad specialties, packings and an extensive line of molded rubber goods. The various goods are illustrated and brief specifications supplement the printed descriptions.

Air Tools.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Catalogue No. 32. Size 6×9 in.; pages, 104. Calls attention to pneumatic tools and appliances and a complete line of air compressors and Duntley air-cooled electric tools. The first includes drills, hammers, riveters and rammers operated by compressed air, compression riveters and hoists. These are all illustrated and described and there are a number of engravings showing them in actual use.

Gasoline Engines.—Palmer Brothers, Cos Cob, Conn. Pamphlet. Illustrates and describes a line of two and four cycle gasoline engines, those of the former type ranging from $1\frac{1}{2}$ to 14 hp. and those of the latter from 3 to 30 hp. Both the make-and-break and the jump-spark systems of ignition are employed and the engines are built with both two and three ports and various numbers of cylinders from one to four, inclusive. Accessories such as whistles, magnetos, reversing gears, gasoline tanks and propellers are also covered.

Water Tube Boilers.—The Milne Water Tube Boiler Company, 30 Church street, New York City. Three loose leaf bulletins. No. 2 calls attention to the use of curved tubes in the Milne water tube boiler, while No. 2A points out the fact that all parts of these boilers are readily accessible when in operation. No. 3 shows how the use of vertical tubes increases the evaporation and keeps the tubes clean.

Rail Welding.—Goldschmidt Thermit Company, 90 West street, New York City. Brochure. Devoted to the Thermit process of rail welding, which is accomplished by pouring superheated Thermit steel around the rail ends. The special advantages of this process are an electrical conductivity equal to that of the rail itself, while at the same time its full strength is developed and the regulating of the composition of the steel used in welding to conform to the characteristics of that of the rail, so that the metal of the joint will have the same hardness as the rail, thus preventing any chance of unequal wear. The illustrations show the welding of an entire rail section, a Thermit weld of the rail base and flange, welding a third rail and the formation of Clark and compromise joints. Space is also given to repairs to motor cases and truck frames, which the company is prepared to do by contract.

Roofing Tin.—N. & G. Taylor Company, Philadelphia, Pa. Four issues of a monthly house organ called *The Arrow*. These call attention to the completion of a century of the company's existence and show a number of buildings upon which the Target and Arrow roofing tin has been used, as well as portraits of prominent members of the firm.

Friction Cone Pulleys.—Evans Friction Cone Company, Newton Center, Mass. Catalogue. Deals with a line of friction cone pulleys designed to be hung from the ceiling or supported on legs. The various types of pulleys are illustrated and a brief table of specifications given.

Screw Machines.—The National-Acme Mfg. Company, Cleveland, Ohio. Calendar. Size 12×15 in. Each of the 12 leaves in addition to giving the calendar for one month contains an illustration either of a screw machine or some of its products. Among these are the multiple spindle screw machine and some products of the screw machine milling attachment, which were illustrated in *The Iron Age*, June 4, 1908, and April 28, 1910, respectively.

Marine Gasoline Engines.—The Clifton Motor Works, 229 East Clifton avenue, Cincinnati, Ohio. Catalogue. Illustrations and descriptive matter explain the operation of a line of gasoline engines made in nine sizes ranging from 10 to 90 hp. The special features of the engines are described at length and the text is supplemented by illustrations. The special advantages claimed for them are accessibility, perfect water circulation, unobstructed passages for the flow of the inlet and exhaust gases, an automatic governor and positive lubrication.

Well Drilling and Prospecting Machinery.—Armstrong-Quam Mfg. Company, Waterloo, Iowa. Catalogue No. 48. Treats of a line of machinery for drilling oil, gas and water wells. All of the different types of machines are illustrated and their special features described, together with a number of views of these drills at work. Space is also given

to engines and boilers for furnishing power, wire rope and leather belting and a number of drilling and fishing tools.

Washers and Weights.—The King & Andrews Company, Chicago Heights, Ill. Pamphlet. Relates to a number of different types of castings, such as slot and packing washers, separator spools, foundation and box washers, sewer manhole covers and sash and counterweights.

Electric Traction Supplies.—The Eureka Tempered Copper Works, North East, Pa. Catalogue and price-list No. 5. Relates to a portion of the copper and brass products of this company, which includes cast and drop forged commutator bars; copper, bronze and brass castings, commutators, mica, insulation, trolley wheels, bushings, bearings, ears, splice sleeves, controller segments and fingers, brush holders, copper hammers, soldering coppers, wire stretchers, &c. The various supplies are illustrated and complete price lists are given for all of them.

Conveying Machinery.—Link-Belt Company, 299 Broadway, New York City. Book No. 96. Size 6 x 9 in.; pages, 52. Describes a number of different types of conveying machinery for sugar estates and refineries and shows actual installations of some of them. Among the different machines covered are cane unloaders, elevators for cane and bags, screw and belt conveyors and a number of accessories, such as chains, sprocket wheels, collars, bearings, &c.

Trimming Presses.—United Engineering & Foundry Company, Farmers Bank Building, Pittsburgh, Pa. Folder. Shows a trimming press which is built in a number of sizes that handles all kinds of work. The special features of the press are an extra heavy wheel or gearing, side cut-off, a steel jaw clutch of heavy construction, a very deep bed and slide and extra high die space.

Steels.—Philadelphia Steel and Forge Company, 50 Church street, New York City. Pamphlet. Describes the line of steels made by this company, which includes automobile, tool and alloy steels and Monel metal. The various automobile steels cover not only the straight carbon steels, but also all the alloy steels called for by the Association of Licensed Automobile Manufacturers. Space is also given to a new natural alloy steel, which is made in four grades, and is claimed to be freer from seams and pipes than any of the other alloys, forges easily and machines like screw stock.

Electric and Refrigerating Machinery.—The Triumph Electric Company, Cincinnati, Ohio. Pamphlet. Size 7 x 10 in.; pages 24. This is an illustrated souvenir of the opening of the company's new plant at Oakley, a suburb of Cincinnati, on April 30, 1910, which was described in *The Iron Age* May 5, 1910.

Machine Molded Gearing.—National Gear Wheel Foundry, South avenue and Walker street, Pittsburgh, N. S., Pa. Catalogue. Illustrates and describes the various kinds of machine molded gearing made by this firm, which includes spur gears, miter and bevel gears, hunting tooth, mortise gears, worm wheels and internal gears and pinions.

Conveyors for Freight and Packages.—Link-Belt Company, Nicetown, Philadelphia, Pa. Book No. 83. Size 6 x 9 in. Illustrated. Calls attention to a number of installations of conveying machinery for handling freight and packages which are typical of the progress in the design of this line of machinery. Space is also given to tray elevators for handling newspapers and stereotype plates in newspaper offices and printing plants.

Leather Belting.—The American Laminated Belting Company, 113 Hudson street, New York City. Booklet entitled "The Difference Between Albeco Laminated and Multi-lap Leather Belting." Gives comparisons of the operating principles, power transmitting qualities and the ultimate economy of both types of belting and shows the ability of laminated belting to handle heavy loads. *The Iron Age*, February 3, 1910, contained an illustrated description of an installation of a 28-in. laminated belt in the Eagle refinery of the Standard Oil Company, Jersey City.

Special Machinery.—Novelty Iron Works, Dubuque, Iowa. Circulars. Call attention to a number of special machines for cutting keyseats, making, pressing and bunching shingles, a belt driven power hammer, a well drill and a cushioned drive trip hammer for blacksmiths' use.

Pipe Sleeves and Plates.—The Beaton & Cobin Mfg. Company, Southington, Conn. Folder. Calls attention to the Adjusto sleeve, which is made of galvanized iron and can be adjusted to any depth between the floor and ceiling from 10 to 16 in. and a line of ceiling and floor plates which are made of gray iron in 15 sizes.

Well Drilling Machines.—Leidecker Tool Company, Marietta, Ohio. Catalogue H. Illustrated. Treats of the Marietta portable drilling machines for oil, gas and artesian wells. Space is also given to a number of special drilling and fishing tools and well supplies.

Pumps and Pumping Machinery.—The John H. McGowan Company, Cincinnati, Ohio. Five booklets. Nos. 30 and 31 treat of single cylinder and duplex pumps, respectively, for various purposes, and practically a full line of both styles of

pumps is shown. No. 34 relates to deep well pumping machinery and tube well supplies. In addition to two styles of pumps, space is given to well strainers, barrels, packing and packing tools. No. 35 deals with feed water heaters and purifiers of the open and the pressure patterns. Both styles are illustrated and described and a table of fuel saving is included. No. 36 describes and illustrates the McGowan duplex pump for boiler feed and tank purposes.

Lighting Transformers.—Allis-Chalmers Company, Milwaukee, Wis. Booklet No. 4024. Sets forth some of the features of the Allis-Chalmers lighting transformers, such as safety, ruggedness, weight, regulation and cost, and points out their adaptability for use in either lighting or power service. The special features of these transformers are additional leads for use where the voltage is 5 and 10 per cent. below that of the station, which enables the same voltage lamp to be used throughout the entire lighting system, and the ability to connect the transformers so that the secondary voltage will be either 110, 220 or 440 volts.

Air Brakes.—The New York Air Brake Company, 165 Broadway, New York City. Loose leaf catalogue. Size 8 x 10 1/2 in. This is the company's 1910 catalogue, describing and illustrating a complete line of air brakes for all classes of railroad service, air pumps and governors, pressure controllers and accessories. The complete index of catalogue plates and the equipment schedules render the finding of any piece of apparatus simple and in addition a table of plate number symbols is given.

Steel Car Paint.—Joseph Dixon Crucible Company, Jersey City, N. J. Booklet. Calls attention to the use of Dixon's silica-graphite steel car paint, which has a natural mixture of silica and graphite for its base. This pigment is inert and practically indestructible, as it is unaffected by heat or cold and unchanged by the action of acids and alkalis. A number of views or cars protected with this paint are included.

Pipe Joint Cement.—H. W. Johns-Manville Company, 100 William street, New York City. Mailing card. Treats of H-O pipe joint cement, which can be used in all kinds of joints. It is claimed for this cement that while it hardens it does not solidify like red or white lead, and joints made with it can be easily uncoupled without breaking the fittings.

Air Compressors.—Sullivan Machinery Company, 150 Michigan avenue, Chicago, Ill. Three bulletins. Nos. 58D, 58F and 58G call attention to the Sullivan line of air compressors, which includes tandem Corliss air compressors, small power driven air compressors and power and steam driven duplex air compressors.

Boiler Settings.—Baltimore Retort & Fire Brick Company, Hull and Nicholson streets, Baltimore, Md. Bulletin No. 2. Illustrated. Calls attention to a number of firebrick special boiler settings which are made of materials least affected by the chemical activity of heat and the combustion gases. Tables give the dimensions of the various shapes as well as the number of common brick used in building settings.

Tank Hoop Lugs.—Racine Tank Lug Company, Racine, Wis. Circular. Treats of malleable iron lugs for tank and silo hoops. In these lugs the hoop end is inserted under cast fingers and the studs on the lug take the place of rivets or bolts in the perforations of the band, which is kept in place by the fingers. Three different styles of lugs are made, all of which are illustrated.

Electric Lighting.—General Electric Company, Schenectady, N. Y. Three bulletins. No. 4777 is devoted to building lighting and contains many illustrations of exteriors and interiors of buildings lighted by G. E. Mazda and Tantalum lamps. Data relative to the subject are included, and the complete lines of both types of lamps are shown. No. 4780, superseding Nos. 4453, 4494 and 4508, illustrates and describes the Gem, or metallized filament incandescent lamp, which has a higher economy and greater illuminating power than the carbon lamp. No. 4781, superseding No. 4647, illustrates the series Mazda lamp for street lighting and contains considerable data showing the advantages possessed by this lamp over other types used for this purpose.

Wire.—A. Leschen & Sons Rope Company, 920 North First street, St. Louis, Mo. Folder. Devoted to the Hercules wire rope, which is made in a dozen styles, divided and classified under the general types of patented flattened strand and round strand. The wire of which this rope is made is drawn and tempered by a secret process which is claimed to have perfected wire rope manufacture and for purposes of identification one strand of the rope is painted.

Recording Instruments.—The Bristol Company, Waterbury, Conn. Seven bulletins. Nos. 126 and 128 give general descriptions and specifications for two types of recording thermometers, No. 129 is devoted to thermometer thermostats, No. 135 calls attention to recording shunt ammeters for all ranges of direct current, No. 141 illustrates and describes round form recording pressure gauges, while Nos. 145 and 146 refer to indicating thermometers and a long distance recording tachometer, respectively. No. 147 relates to the Bristol-Durand radii averaging instrument for circular chart records, which was illustrated in *The Iron Age* June 30, 1910.

Obituary

W. H. WOODWARD died November 27 at his summer home in Weld, Maine, aged 70 years. He was associated with his brother, J. H. Woodward, and others in the earlier operations of the Woodward Iron Company in the Birmingham district. He was the first president of the company. The first furnace was built in 1882, and was blown in in 1883. W. H. Woodward later retired from the presidency of the company and engaged actively in other business enterprises in Birmingham, his brother, who had been secretary and treasurer of the Woodward Iron Company, being then elected president.

HENRY GRANT THOMPSON, secretary and treasurer of the H. G. Thompson & Sons Company, New Haven, Conn., is dead at Paris, France, aged 57 years.

FRANK W. WHITAKER, Hamilton, Ohio, president of the Black & Clawson Company, Hamilton, a director in the Sidney Steel Scraper Company, Sidney, Ohio, and a prominent banker, died at his residence in Hamilton, November 24, aged 60 years.

DAVID HUNT, JR., general manager of manufacturing for the E. M. F. Company, Detroit, Mich., was killed in an automobile accident near Yale, Mich., November 26. After leaving Harvard University, Mr. Hunt became connected with the Boston office of Manning, Maxwell & Moore, and later entered the New York office of that firm. About 10 years ago he was made treasurer of the Bausch Machine Tool Company, Springfield, Mass., and was with that company two years, resigning to become general sales manager of Warner & Swasey, Cleveland, Ohio. He was connected with this firm about six years, or until February, 1910, when he went to Detroit. He was about 36 years old. His advancement in machinery selling and manufacture was rapid, and he had a wide acquaintance throughout the trade.

E. J. NICHOLS, secretary of the T. H. Symington Company, Baltimore, Md., died November 25, aged 41 years. He had been in poor health for over a year, his death following shortly after an operation at the Maryland University Hospital. He was born in Delmar, Del., had been connected with the Symington interests for some 16 years, and had been secretary of the company since its formation. He leaves a widow and a daughter.

ABEL CHARLES WHITTIER, Medford, Mass., is dead at the age of 82 years. He was for 15 years treasurer of the Whittier Machine Company, Boston.

EDWARD B. LEAF, president of the E. B. Leaf Company, iron and steel merchant, Philadelphia, Pa., and also president of the Spring City Bloom Works, Spring City, Pa., died at his residence in Philadelphia, November 23, from acute Bright's disease. He was born at Pottstown in 1866, and started in the iron business in 1892 as a co-partner in the firm of Potts & Leaf. In 1900 he withdrew from that firm and began business under the name of E. B. Leaf & Co., and on the incorporation of the E. B. Leaf Company, in 1909, he became its president. He leaves a widow and two daughters.

OCTAVE CHANUTE, an eminent civil engineer, died in Chicago November 23, aged 78 years. He was born in Paris, was brought to America by his parents in 1838, and became prominent in railroad engineering. At one time he was chief engineer of the Erie Railroad. He was the builder of the Kansas Pacific Railroad, the Union Stock Yards of Chicago, and several important railroad bridges. His scientific researches into methods for improving railroad service made him one of the most distinguished engineers of his day. In recent years he paid much attention to flying machines and is familiarly known as "the father of the aeroplane." His ideas were recognized as scientifically correct after the Wrights had made their first successful flights and

had acknowledged that it was Chanute's book, "Progress in Flying Machines," published in 1894, which had turned their attention to the heavier-than-air experiments.

Personal

A. E. Hughes, who has been general manager of the Texas Rolling Mill Company, Fort Worth, Texas, for some time, has severed that connection and will take a brief vacation in the mountains of Mexico. His plans are not yet ready for announcement.

S. A. Benner has resigned as general manager of sales of the Carnegie Steel Company, and will become general sales manager of the Pittsburgh Steel Company, the change taking place January 1.

Alfred H. Schutte, of the German machinery selling house of that name, who has been visiting machine tool builders in this country, sailed November 29 for Germany.

C. W. Lang, construction superintendent of the Dominion Coal Company, is leaving that position to engage in the service of the Brown Machine Company, New Glasgow, Nova Scotia, in which he has purchased an interest.

W. A. Green, district manager and treasurer of the Republic Iron & Steel Company at Birmingham, Ala., severed his connection with the company December 1 to become associated with the John W. Gates oil interests in Texas.

J. A. Farrell, president of the United States Steel Products Company, is in Europe for a few weeks.

A box party was given by the heads of departments of Milliken Brothers, Inc., in honor of Francis Dykes, general manager of the company, at Weber's Theatre, New York, on the evening of November 26. After the theatre a supper was served at the Breslin Grille. Besides Mr. Dykes there were present E. C. Wallace, president of the company; John M. Ellis, James M. Ryan, Charles W. Eckhardt, F. H. Boyle, J. E. Jennings, H. M. Ward, S. J. Reeves, John Cargill, W. R. Waterbury, Richard Harragan, W. T. Voegel, D. H. Roney, L. B. Loomis, C. R. MacCarey, J. P. Pittinger, George Wambold, C. E. Buckton, McClellan Reeves, Nelson Place, Wm. J. Sage, E. H. Frisell, J. C. English and H. K. Ryerson.

Edgar Allen & Co., Ltd., Sheffield, England, announce that Schrock & Squires, 291 Pearl street, New York City, have been appointed Eastern agents for the sale of their tool steels. Large stocks of all the company's products will be carried by the Eastern agents in order to promptly meet the requirements of customers. This agency arrangement will be supplemented by co-operation on the part of the Chicago office, which is the American headquarters of the company, and also by J. C. Ward, the director and general manager in the United States.

The Pawling & Harnischfeger Company, Milwaukee, Wis., in order to care for the great increase in its business on the Pacific Coast, has opened a branch office in the Washington Building, Portland, Ore., in charge of R. K. Morse, who for some years has been a member of the company's engineering staff at Milwaukee. In addition to the engineering problems to be taken care of, Mr. Morse will also act as sales representative for a complete line of cranes, hoists and lumber handling apparatus.

The new open hearth furnace of the New York State Steel Company, Buffalo, N. Y., is nearly ready for operation, and the company expects to begin making steel in it December 10.

The Tariff Question

An Early Revision Not Expected

WASHINGTON, D. C., November 29, 1910.—The results of the recent Congressional elections, which have changed the Republican majority of 56 in the House of Representatives to a Democratic majority of more than 60, have brought the tariff question again to the front at an unexpected early date, and, judging by the many communications received here from business men in all parts of the country, much concern appears to be felt lest the Payne-Aldrich tariff act shall be taken up for amendment in the near future. While any attempt at tariff legislation must necessarily be more or less demoralizing to the business of the country, the anxiety now felt is premature, if not wholly unnecessary.

The Old and New Congress

The coming session, opening December 5, which is the last of the Sixty-first Congress, expires by constitutional limitation March 4, and so far as actual tariff legislation is concerned will be devoid of interest, although it is to be expected that a foretaste of the battle that will be waged in the Sixty-second Congress will be given by individual Democratic members, who will hasten to place their views before the country in the form of bills for the amendment or repeal of the Payne-Aldrich law.

With the meeting of the Sixty-second Congress in December, 1911, the country will find the House, including the Ways and Means Committee, in control of the Democrats, but the Senate, including the Finance Committee, and the Presidency in the hands of the Republicans. This will mean that, while the Democrats may initiate more or less comprehensive legislation, no measure can reach the President without the consent of the Republican Senate and may be vetoed by him even in the event that a combination of Democrats and Republican insurgents in the upper House should reach an agreement with their Democratic colleagues in the lower body upon special or general tariff measures. No possible combination could be effected to pass a tariff bill over the President's veto.

The President's Influential Position

The exact significance of this situation should be understood by all who are interested in prospective tariff legislation. As the Republican majority in the Senate in the Sixty-second Congress will be much smaller than at present, it is quite possible that the Democrats and insurgent Republicans may be able to poll a majority vote on the tariff and other important commercial propositions. It is, therefore, evident that the President will occupy a position of enormous influence respecting tariff legislation, for, should he desire any downward revision of the Payne-Aldrich act, the Democratic leaders of the House would be only too willing to pass a measure to his liking, even if it did not entirely meet with their views, and such a bill would probably be approved by the Democrats and Republican insurgents of the Senate.

The Democratic programme with respect to the tariff has not yet been outlined in detail, but the main points are now being considered by the Democratic leaders, who have for their guidance the history of the two Congresses in which Representatives Roger Q. Mills of Texas and William M. Springer of Illinois, two lifelong Democrats, occupied the post of chairman of the Ways and Means Committee, backed by a Democratic House, opposed by a Republican Senate.

Chairman Mills adopted a comprehensive programme, intended to be declaratory of his party's principles, for he knew that the enactment of a Democratic tariff law at the time was out of the question.

He caused to be prepared and passed by the House a complete revision of the tariff law, and although this bill was smothered by the Senate, it caused no little anxiety to business interests, and especially to importers and manufacturers, who were not thoroughly familiar with the parliamentary situation at Washington. Chairman Springer, on the other hand, adopted what was known as the "pop gun" policy, which consisted in reporting and passing a number of independent measures reducing and repealing the tariff on certain commodities of general use. Mr. Springer styled this method of legislation "punching holes in the tariff," and argued that the popularity of certain of the propositions among the people at large would be sufficient to force the Senate into taking favorable action. None of these bills passed the Senate.

Organization of the New Congress

All indications now point to the election of Champ Clark of Missouri, the present minority leader and ranking Democratic member of the Ways and Means Committee, as Speaker of the Sixty-second Congress. One of his most important duties will be to reorganize the Ways and Means Committee. Should he follow the principle of seniority, which is rarely departed from, he will appoint Oscar W. Underwood of Alabama chairman of the Ways and Means Committee. Mr. Underwood has seen long service in the House and his face is familiar to iron and steel producers who have come to Washington on tariff errands during the past decade. While he is a conscientious low tariff advocate, he is by no means a radical theorist.

A reorganization of the Senate Committee on Finance will also take place at the beginning of the Sixty-second Congress for the reason that the veteran chairman, Senator Nelson W. Aldrich of Rhode Island, will retire from the Senate March 4, in order that he may recuperate his health, which has suffered severely because of the heavy strain to which he has been subjected during recent years. Senator Penrose of Pennsylvania is the ranking Republican member of the Finance Committee and is likely to succeed to the chairmanship. Of course, the committee will be strongly Republican and will be likely to make short work of any tariff measure that may be passed by the Democratic House. The programme will probably be to pigeon-hole all House bills on the tariff and, if any legislation is forced through a combination of Republican insurgents and Democrats to pass a House bill, it will be necessary to discharge the Finance Committee from its consideration by a direct vote on the floor.

Work of the Tariff Board

In this connection the work of the Tariff Board, organized under the provisions of the Payne-Aldrich act, must not be overlooked, for President Taft is giving renewed evidence of his intention to utilize this board for more or less comprehensive tariff revision in the not far distant future. Since the election he has held several conferences with the majority leaders of both Houses, his purpose being to ascertain the practicability of securing legislation at the coming session that will render the board permanent in its tenure and as independent as possible of Congress hereafter. The President wishes to divorce the tariff from politics and secure the means of effecting an intelligent if not a thoroughly scientific revision of customs duties when next the subject is taken up, but he realizes that there is an element in the present Congress, which will probably also be found in the Sixty-second Congress, opposed to the board and anxious to starve it out by refusing appropriations. The President would like to have a provision enacted at the coming session that would take care of the board for a series of years, but this is contrary to congressional precedents, and it is probable that nothing more will be accomplished than the appropriation of a generous sum for the

work of the board during the fiscal year beginning July 1 next.

The Tariff Board has laid a broad foundation for a more extended investigation of the tariff question in all its phases than has ever before been attempted in this or any other country, with the possible exception of Germany, where scientific methods have characterized tariff legislation for more than a decade. The immediate objects of the board have been quite generally misunderstood and misstated in the daily press, which has given business men the impression that the board contemplated making recommendations for changes in the present law at a comparatively early date. As a matter of fact, the board is confining its activities at present to a far-reaching inquiry concerning the relative cost of production in this country and abroad of the leading articles of importation and especially those as to which there has been the greatest amount of controversy in the Congressional tariff debates. The board has no plans for the utilization of the information thus to be obtained, but will hold it for the guidance of the President and of Congress, should an attempt be made at any time to overhaul any portion of the Payne-Aldrich law.

W. L. C.

Youngstown Iron & Steel Company Extensions

The Youngstown Iron & Steel Company, Youngstown, Ohio, for many years known as the Youngstown Iron & Steel Roofing Company, has recently made some large additions to its plant, which will about double its capacity in the manufacture of black and galvanized iron and steel sheets and other finished products. The total number of mills it now operates comprise eight hot sheet mills, one jobbing mill, one plate mill, three roughing mills and three cold mills. Their combined capacity is about 100,000 tons of plates and sheets per year.

The newest additions to the plant include a 30 x 72 in., three-high mill, served by two 35-ft. Laughlin continuous heating furnaces, and a 30 x 60 in., two-high jobbing mill to roll light plates and sheets up to 56 in. wide. The first named mill is equipped with electrically driven roller tables and conveyors, and will roll plates from No. 12 gauge to $\frac{3}{4}$ in. in thickness, up to 68 in. wide, and to a maximum length of 32 ft. The mill tables, conveyors and shears were furnished by the Lloyd-Booth Works of the United Engineering & Foundry Company at Youngstown, Ohio. The roller levelers and roll lathes were built by the American Roll & Foundry Company, Canton, Ohio, while the circular shears and slow speed device for turning rolls and housings were built by the A. Garrison Foundry Company, Pittsburgh. On the second mill light plates and sheets will be rolled up to 54 in. wide. The product of this mill will be furnished in red steel, blue annealed or box annealed in Bessemer or open hearth stock for deep stamping and drawing purposes. This mill was also built by the United Engineering & Foundry Company.

The eight hot sheet mills consist of one 28 x 48 in., one 28 x 42 in., one 28 x 38 in., three 28 x 36 in. and two 28 x 32 in., together with their complement of roughing mills and cold roll mills for finishing the product. The sheets from these mills are finished in one, two and three pass, and full cold-rolled finish, pickled, box annealed, patent leveled and resquared in Bessemer, open hearth and special deep stamping quality. The galvanizing department contains three pots, and is equipped to galvanize sheets from No. 10 gauge up to 54 in. wide and as light as No. 31 gauge.

These sheet mills are contained in a steel building, 130 x 714 ft., in length, an addition, 135 x 350 ft., having been designed and erected by the Hunter Construc-

tion Company, Youngstown, Ohio. The building is commanded by two Niles and one Shaw 35-ton cranes, with 70-ft. span and two 10-ton gantries. The mills are driven by a 48 x 60 in. Corliss engine built by the C. & G. Cooper Company, Mt. Vernon, Ohio.

The company has also recently built a new power house of steel skeleton construction, 50 x 150 ft., with brick walls and covered by a concrete roof, reinforced with Duplex metal lath. In this building, in addition to the former equipment (which consisted of one 200-kw. and one 100-kw. Bullock generator, driven by one Buckeye and one Erie steam engines) has been installed, a 500-kw. Crocker-Wheeler generator direct connected to a 20 and 40 x 42 in. C. & G. Cooper cross compound engine. The steam for driving these engines will be furnished by a battery of 1600-hp. Stirling water tube boilers, built by the Babcock & Wilcox Company, Barberton, Ohio.

A slab storage building, 75 x 200 ft., and a sheet bar storage building, 75 x 275 ft., have also been erected. These buildings are steel structures, covered with corrugated sheet iron. The slab storage building is equipped with a Shaw 20-ton electric crane of 75-ft. span, equipped with Cutler-Hammer lifting magnet, while the sheet bar building is equipped with a Shaw especially wide spread bridge 15-ton crane of 75-ft. span. A new building for the pressed steel department, 100 x 300 ft., of steel skeleton construction, with brick walls, concrete roofing and cement floor, has also lately been finished and occupied. It is equipped with a 5-ton Shaw electric crane, with 50-ft. span.

Quite a large part of the output of this company in black and galvanized sheets is used in its own finishing departments for the manufacture of Mahoning and Youngstown expanded metal lath, Youngstown and Mahoning expanded metal for reinforced concrete, metal studding, a full line of different forms of metal roofing, T and C sheet lath and also Duplex lath. The last named is a new lath recently put on the market which, when used for reinforcing concrete roofs, requires no centering, the top side of the lath being finished in the same way that ordinary cement sidewalks are laid, the under side being plastered. In its pressed steel department the company uses steel sheets in the manufacture of shapes for the agricultural implement trade, including the Danielson metal single tree for which it is having a very active demand. The officers of the company are as follows: L. E. Cochran, president; John O. Pew, vice-president and general manager; C. A. Cochran, secretary; Mason Evans, treasurer; C. B. Cushwa, general superintendent; G. F. Danielson, superintendent pressed steel department.

The Foreign Trade Balance for 10 Months.—In the first 10 months of 1910 the total imports to the United States of both free and dutiable merchandise amounted to \$1,296,226,777, as compared with \$1,196,267,707 in the first 10 months of 1909, an increase of \$99,959,070. In the first 10 months of 1910 our total exports of domestic merchandise amounted to \$1,398,624,710, as compared with \$1,339,327,473 in the same period of 1909, an increase of \$59,297,237. The value of exports in the first 10 months of 1910 exceeded that of imports by \$102,397,933, a decrease of \$40,661,833 from the first 10 months of 1909 and of \$379,449,983 from the first 10 months of 1908. October exports showed an increase in manufactures and a decline in foodstuffs. Imports of manufacturers' materials fell off. As was expected, the fall movement of grain abroad is changing an adverse balance of trade to a favorable one.

The population of the city of Seattle, Wash., is 237,194, an increase of 156,523, or 194 per cent. The population of Portland, Ore., is 207,214, an increase of 116,788, or 129.2 per cent.

The New Gould & Eberhardt Vertical Continuous Miller

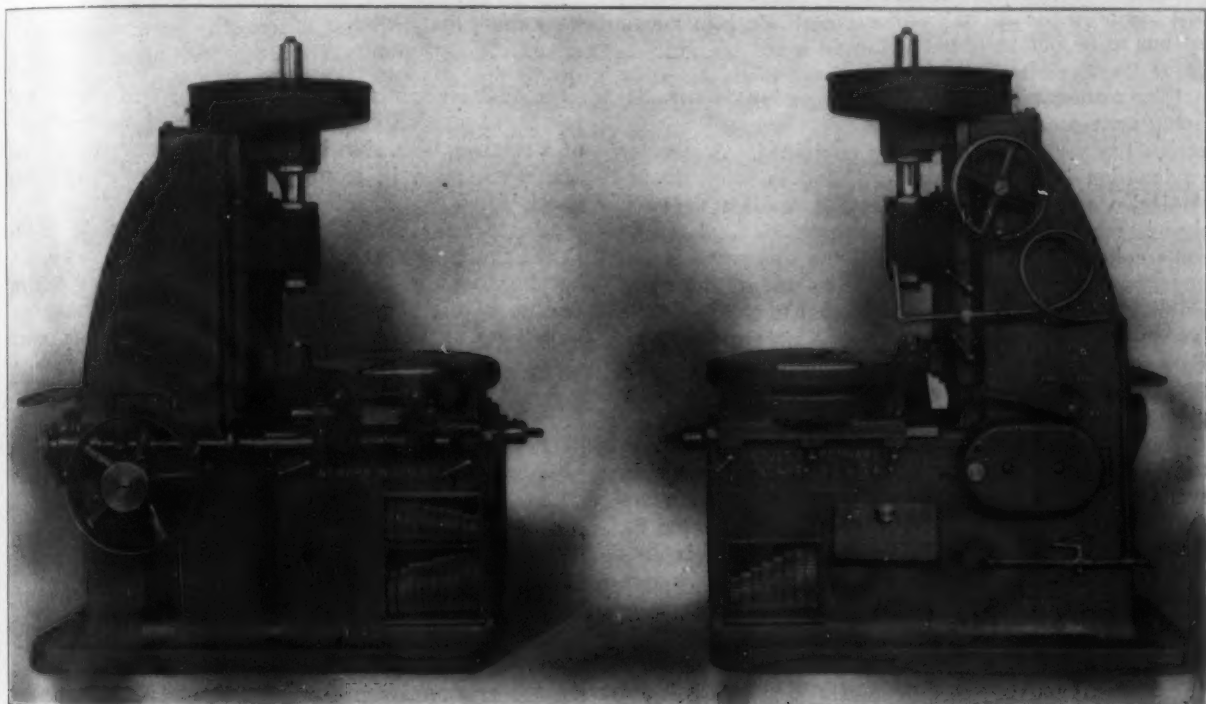
For turning out duplicate work rapidly and reducing the time lost in setting work, Gould & Eberhardt, Newark, N. J., have designed a continuous vertical milling machine. This tool employs high speed steel milling cutters and is offered as a simple machine with a powerful drive in both the spindle and the table, which revolves continuously. It is claimed that the miller is one that a boy can keep running and working throughout an entire day, his duty being merely to replace finished pieces with new ones.

The main frame is of box section and is cast in one piece, making it strong and rigid. Like the gear hobber of this company, which was illustrated in *The Iron Age*, November 3, 1910, the face plate or revolving work table is made in one piece, with the worm

ordinary type can be used and pulled into place by a draw bar extending through the center of the spindle. The main spindle slide is integral with its bearing and has vertical adjustment. At the extreme lower end is an outer spindle support capable of vertical adjustment independently of the main slide.

If desired a pump can be furnished with the miller and when forming a part of its equipment is located in the base of the machine. A pan cast around the edge of the bed serves to catch any oil that might drop around the machine. The total net weight of the milling machine is 3000 lb.

The Increase in Consumption of Copper.—It is pointed out, says the *Wall Street Journal*, that, based upon the increase in gross business of the large electrical companies, copper consumption this year will show an unparalleled increase, whereas there has been



Driving Side.

Operating Side.

Two Views of a Continuous Milling Machine Built by Gould & Eberhardt, Newark, N. J.

wheel below it, so that the torsional stresses are minimized. A coarse pitch hardened steel worm meshes with this worm wheel and can be quickly disengaged and the table revolved by hand if desired. This is an advantage, as it enables the operator to see if the work runs true when the periphery of a part is being milled. Means are provided for taking up wear between the worm and the worm wheel.

A direct gear drive is supplied for the table and circumferential feed changes ranging from 4 to 14 in. per minute are available through change gears. The table revolves on a large floating washer within the work slide. This washer can be adjusted longitudinally by a dial graduated in thousandths of an inch and the slide has a guard inclosing the table. This guard prevents the chips from scattering over the floor and the machine and at the same time a small scoop attached to the revolving table automatically carries the chips away from the work and drops them into the base of the machine.

The large diameter chrome-nickel steel spindle runs in bronze bearings and has hardened and ground steel washers to take the thrust. Any wear that occurs in the main spindle bearing can be compensated for. The end of the spindle is threaded to receive end or face milling cutters and there is also a slot or keyway for driving them. Taper shank cutters of the

a moderate increase only in copper production. The General Electric Company, Western Electric & Mfg. Company, Western Electric Company and Allis-Chalmers Company, four of the largest consumers of copper in the world, show an increase in gross sales averaging more than 20 per cent. The General Electric Company this year will do a business of close to \$70,000,000, comparing with \$51,565,000 for the 11 months ended December 31, 1909, and \$44,540,000 for the full year ended January 31, 1909. The Westinghouse Electric & Mfg. Company will show a gross business of \$40,000,000, comparing with \$29,248,000 last year. The Western Electric Company's gross for the current year will reach over \$60,000,000, comparing with \$46,000,000 in 1909.

The Waterbury Crucible Company, Waterbury, Conn., is selling its building, machinery and stock, and will discontinue business in that city. It has been manufacturing crucibles in Waterbury for the past five years. For some time the company has been negotiating with the Chamber of Commerce of Detroit, and arrangements have been made for the establishment of the company in that city and the erection of a larger plant than that in Waterbury. E. B. Seidel is president and general manager of the company; L. G. Tenney, treasurer, and A. W. Force, secretary.

The Gyroscope and Its Useful Possibilities—I

Explanation of Its Phenomenon—Precession

BY ELMER A. SPERRY, NEW YORK.

Old as the gyroscope is and familiar as its action it has remained for the present generation to solve its mystery and discover its commercial utility. It is a privilege at this stage in the transition of the gyroscope from a scientists' and children's toy to an important engineering mechanism to present this series by one of the world's greatest authorities on the subject. Mr. Sperry took up the study of the gyroscope fascinated by its mystery and convinced of its value as the producer of an important mechanical force. To him belongs the credit of discovering a new principle of applying it whereby its effectiveness as a stabilizer for ships, monorail cars and aeroplanes may be enormously increased, and the same results secured with one-tenth the weight required in former applications. In the next three issues will be reviewed the work of other experimenters and the author's own developments along these lines.

The gyroscopic phenomenon, precession, is not generally understood and it is to be regretted that this reaction has not been adequately explained. A popular explanation is seldom attempted, and in some mathematical works so much mystery is thrown about it that it seems impossible of comprehension. Even in some colleges the explanation of the gyroscope is not undertaken. It is not a paradox, as one of the great English mathematicians has been wont to call it for the last 40 years, but is really extremely simple and natural. By a few simple experiments, in connection with which there need be no mathematics, it can be shown why the phenomenon takes place.

Nothing but angular motion operates with the gyroscope, that is, if linear motion is impressed upon it, even of large magnitude, no gyroscopic reaction results, but when angular motion is impressed around an axis which is either within the disk or which is outside, or even remote from the disk, so long as it moves around a center, a certain phenomenon takes place. It is simply this: When there is impressed upon a rapidly rotating disk, an angular motion, it is seen suddenly to take upon itself another angular motion in a plane normal to or at right angles to that of the original impressed force or motion. Precession, or the motion that the wheel or disk takes upon itself, depends upon the direction of the rotation, and the direction of the impressed forces, as will gradually be made clear by several experiments referred to later.

Popular Misconceptions

A year ago last summer the author took occasion to investigate the gyroscope, especially as to its various practical applications, and to this end, interviewed many in Europe that have written on the subject, or have become prominent in its applications. He found people of large attainment who had abandoned the gyroscope, as had some of the English experimenters, who characterized it in rather interesting ways. One had worked out this synopsis of the trouble and had abandoned all hope of understanding the gyroscope. He said, "A gyroscope is positively a net work of negations of the natural." Another found fault with the gyroscope because it was "A phenomenon of indirection." It is a sort of indirection, a motion to the side. Another man said it always worked "at cross purposes." All these statements contain some truth, as is appreciated when the gyroscopic phenomena are investigated.

The gyroscope has always been a fascinating subject to mathematicians. Newton spent years studying it and impressed his name on one of the motions of the gyroscope, the "Newtonian motion." By certain experiments it is possible to show the causes of preces-

sion, to "manufacture precession," so to speak, and see develop this sudden and unexpected automatic tilt of a rotating disk, showing that as soon as you impress one force upon it, another force instantly manifests itself.

As to some familiar applications, Dr. Schlick believed the front wheel of the bicycle to be gyroscopic, but it cannot be to any great extent. The directive feature of the bicycle is present whether the machine is moving or standing, a tip to one side or the other

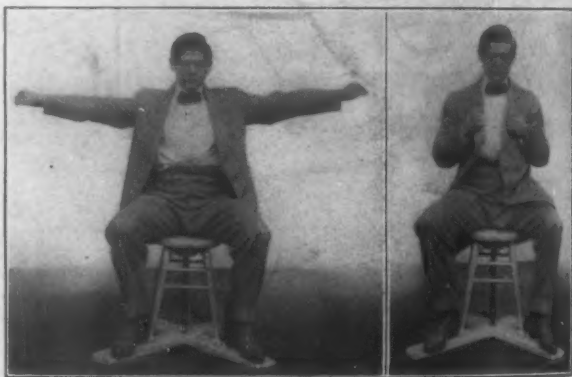


Fig. 1.

Fig. 2.

Apparatus to Illustrate That Speed of Rotation for a Given Force Varies with Extension of Mass.

will cause a change in direction of the front wheel which, therefore, cannot be gyroscopic. More gyroscopic effect is present in railroad trains. Owing to the rapid rotation of the wheels the outer rail, on curves, should be considerably elevated, in addition to that required by centrifugal force alone. Some believe, and with good cause, that the accident to a suburban train just out of New York two or three years ago, when electrical motors were first used in this service, was due in large measure to the gyroscopic action of the masses in rotation which were much larger than had theretofore been present on steam locomotives.

A familiar phenomenon that some have wrongly considered gyroscopic is the turning over of a cat when it falls down. In reality the phenomenon depends upon the differing radius of action of a mass. Imagine one rotating slowly sitting upon a pivoted stool with his arms extended, as in Fig. 1. When the arms are drawn down close to the body, as in Fig. 2, the velocity of spin is greatly increased, and as they are again extended the spin will slow down. The cat is able to utilize this principle, with the difference that it has four extendable appendages instead of two. If a person should try to rotate himself on a stool he would

find it very difficult. The cat, however, has more facilities; with its hind legs extended and its front legs drawn close to its body, it twists its body one way and then extending its front legs and retracting its hind legs it twists the other way, thus turning in space.

How the Gyroscope's Power Was Discovered

It is more than probable that the true engineering significance and the enormous power of the gyroscope were first discerned in this country. In the early history of our navy, a torpedo was used known as the Howell torpedo, which depended for its action upon the rapid rotation of a flywheel. The torpedo was cigar shaped, and amidships had a steel wheel some 16 in. in diameter that was rotated up to about 16,000 rev. per min. The rotation was so rapid that the 1-64 in. clearance left around the periphery was taken up by the centrifugal stresses acting upon the elasticity of the steel wheel, which was thus utilized as an automatic brake. This wheel was coupled to and served to

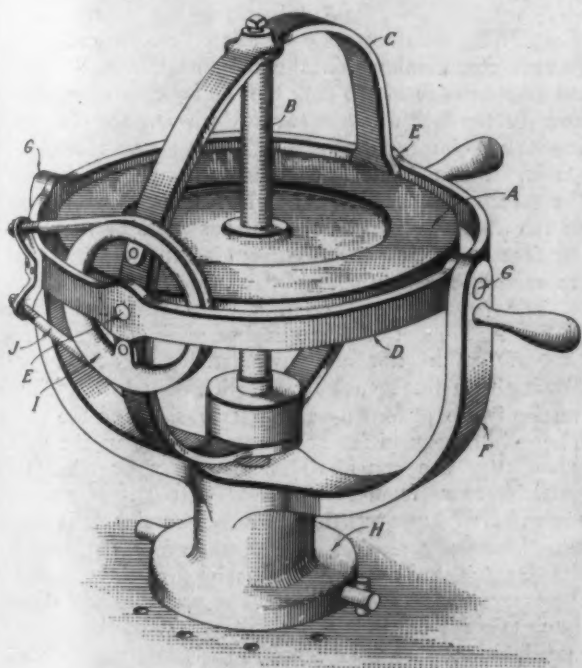


Fig. 3.—A Typical Gyroscope.

drive the propeller when spun up. A Dow steam turbine, the forerunner in America at this early time of the present steam turbine, was directly connected to spin the heavy wheel up to speed.

Lewis Nixon, then of the navy, had charge of some attempts at marksmanship with the Howell torpedo. The ship was anchored a certain distance from the target, and after some difficulty in starting the steam turbine, they finally, after quite a lapse of time, succeeded in getting the turbine and wheel up to speed. Meanwhile the tide had turned, and the torpedo was found pointed considerably to one side of the target. Some of the members of the crew were ordered to change the torpedo and point it toward the target, but they found it very difficult indeed. They had no trouble lifting it, but could not budge it laterally; it would not change its direction. The lieutenant called for more men, and finally it started slowly and, as the men trod the deck, he saw they changed the torpedo's relative position upon the boat considerably, so he stepped back and took a sight at the target, but, to his great surprise, found the target was still in the same quarter. In their efforts they had moved the ship around under the torpedo, which contained the spinning wheel and which had refused to move.

This was one of the first times that the real power of the gyroscope had manifested itself; and being noted in engineering circles, it set many to thinking

that in this revolving mass was a force much more powerful than had heretofore been thought possible, and investigations were set on foot to find out something more about the power of the gyroscope.

The Gyroscopic Phenomenon

Now as to the phenomenon itself, and what constitutes precession. When a force is impressed upon a revolving wheel to turn it out of its plane of rotation,

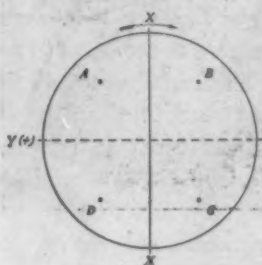


Fig. 4.

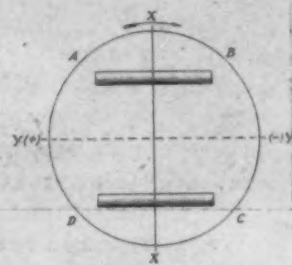


Fig. 5.

Diagrams for Analyzing Gyroscopic Action.

why should it suddenly and unexpectedly spring out of this plane at an entirely different angle? Suppose Fig. 3 to represent a typical gyroscope consisting of a spinning wheel A upon a vertical axis B in a gimbal mounting consisting of an inner or precessional ring C and an outer or base ring D, these rings being pivoted together at E and E, and the outer ring being again pivoted to the fork F at points G and G, the whole mounted upon the base or standard H. When there is no rotation of the disk or wheel, then as the outer ring D is swung upon its pivot G G all parts supported by the ring D move with it and partake of the same motion about an imaginary line drawn from G to G. When, however, the disk A is set spinning and forces are applied to the outer ring D, causing it to swing upon the axis G G, something new happens, and the inner ring C and wheel A are seen to instantly respond by swinging vigorously upon pivots E E. Upon ceasing to move the base ring D, the tilting motion on the part of ring C and disk A instantly and abruptly ceases.

It is found that the direction of the tilting of ring C depends upon the direction of the impressed forces upon base ring D. It will also be noticed that pivots E E lie about at right angles to the pivots G G. When

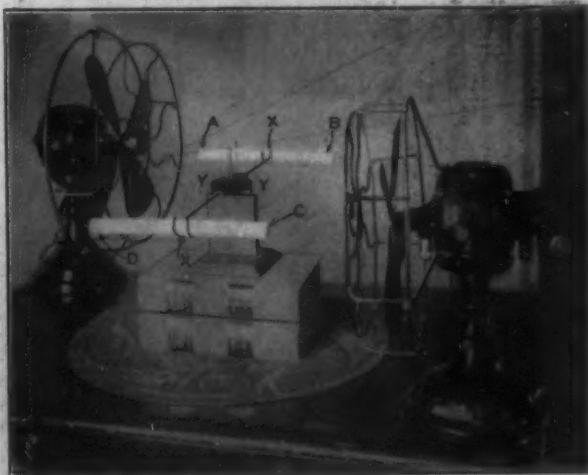


Fig. 6.—Apparatus to Illustrate Gyroscopic Action.

the rotation of disk A is stopped and the same motions are impressed upon ring D, ring C is found to be wholly inactive and simply swings about an imaginary line drawn from G to G just as it should on account of being supported from the ring D. Upon again starting the wheel A spinning in the opposite direction, it is observed that upon attempting to move the base ring

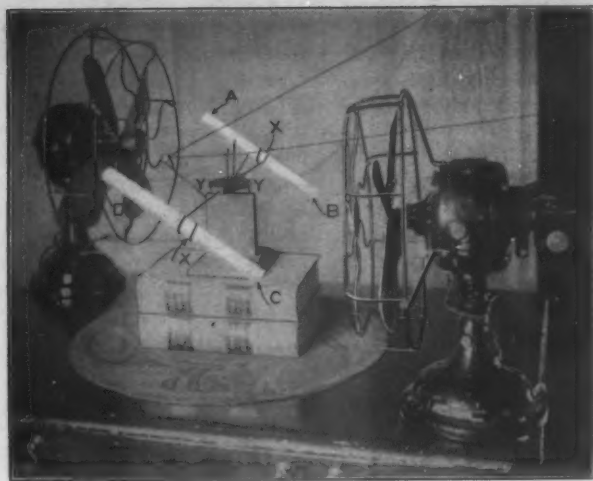


Fig. 7.—Typifying a Force Impressed on One Side.

D the ring C and the disk A again become instantly responsive and swing vigorously about the pivots E E, but that now the direction of motion of the ring C is opposite, inasmuch as the wheel is spinning in the opposite direction as stated. These vigorous to and fro motions of the revolving mass A and its supporting ring C on the line E E result from forces or motions impressed upon ring D swinging on a wholly different line, that of G G, at right angles to E E.

How the Phenomenon May Be Studied

A circle may be represented as a polygon with an infinite number of sides; likewise circular motion may also be similarly considered. For convenience the number of sides may be reduced to four. The analogy still holds good, and it will be noted that a particle which was at one instant located at A upon Fig. 4 is presently at B, then at C, then at D, and back again to A. This is simply polygonal motion reduced to a figure of four sides, and it will at once be seen that although it is true that the particle has traversed a circular path between the points, these deviations from straight lines upon one side of the center are opposite and equal to those upon the opposite side of the center. It is immaterial how the particle traveled between the points so long as these forces are all balanced within the mass of the wheel itself, so it is allowable to think of the particles as passing in straight lines between the points, and it is necessary to follow them through all the peregrinations of actual motion, because all these actual deviations from straight lines are balanced within themselves as stated.

Now suppose these particles formed a part of the wheel or disk rapidly revolving clockwise, and a motion is impressed about axis X X, shown upon the disk

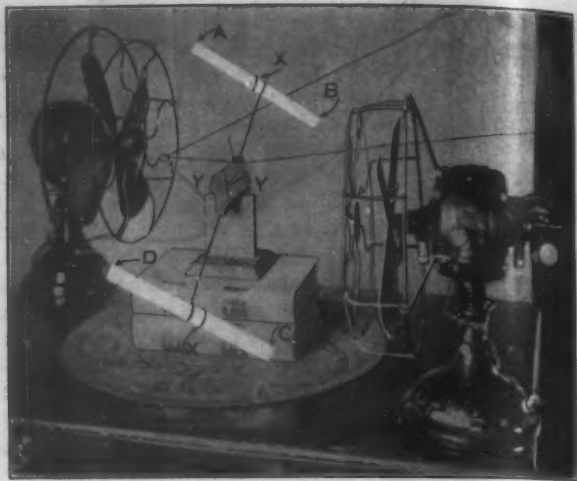


Fig. 8.—Result of the Force Impressed in Fig. 7.

in Fig. 4. Suppose this motion depresses the right side, marked (—) and raises the left side, marked (+). The gyroscope law states that the disk will now be seen to automatically take upon itself a motion, and the bottom edge of the disk will be depressed or recede and the top will move outwardly toward the observer, the disk taking on a movement about a new axis, Y Y, shown in dotted lines. Studying this diagram reveals the fact that there is a marked difference in the effect of the tilting motion on the various pairs of positions; for instance, when the rotating disk is swinging upon its vertical axis.

The particles in travelling these two paths, B C and D A, are not asked to change their general direction of motion, nor are any particles while they are passing in a line generally parallel with line X X, or vertically up or down on the two sides of the disk. There is a very different state of affairs in the pairs when they are considered horizontally or when the particles cross from A to B and C to D. It must be remembered, however, that as the disk spins, it is being tilted upon the axis X X, and therefore the ends of the line A B are moving in opposite directions, A coming forward and B receding. The particles are, therefore, asked to flow or precipitate themselves downwardly in their passage from A to B and are deflected out of the constant plane in which they were operating between the points D and A; where both of these points were travelling in the same direction, now they are asked to pass between points travelling in opposite directions, or, as stated, to flow down hill.

Now imagine a myriad of particles passing constantly between A and D, each possessed of the familiar quantity known as inertia; in other words, they are "strong-headed" and refuse to go down hill, preferring rather to raise the hill up to meet their needs

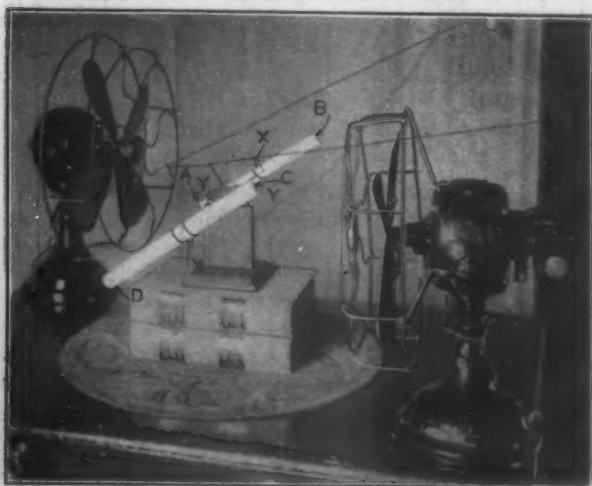


Fig. 9.—Typifying a Force Impressed on the Other Side.

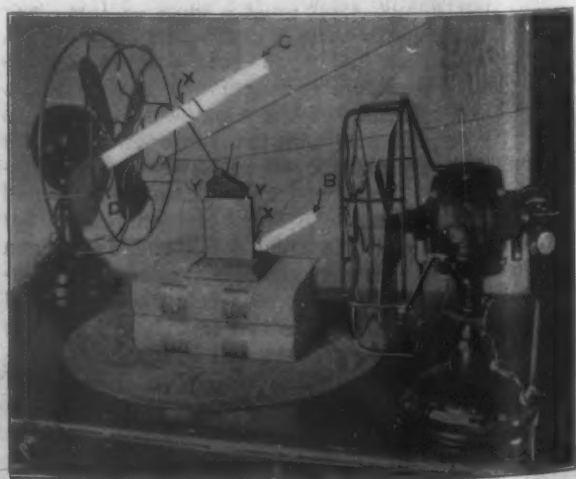


Fig. 10.—Result of the Force Impressed in Fig. 9.

as to constant plane of rotation. The particles all being below the surface of the wheel and within the mass itself, all this becomes very easy, and the top of the wheel is therefore given a definite tendency to move outward and away from the plane of the diagram. The particles that are passing horizontally from C to D in the lower half of the disk, since the left side of the disk is now being depressed, are asked to ascend a hill, D being higher than C to the same extent to which B was lower than A. Again these particles refuse to have their plane of rotation changed and set about their task of pushing the hill itself down, which causes a second strong and definite tendency on the part of the disk to have its bottom or lower half depressed or moved away from the observer and below the plane of the diagram.

Therefore a new couple is set up tending to rotate the disk about on the horizontal line Y Y, inasmuch as the particles passing from A to B are all trying to raise the upper half of the disk, and those passing from C to D are constantly trying to depress the lower half of the disk. This new angular motion which the disk manifests, and which has been described as the couple tending to rotate it about the new axis Y Y, is known as gyroscopic precession.

It will be further seen that as soon as the original effort to tilt the disk upon its vertical axis, X X, ceases, all the four paths between the lettered points remain in the same plane and there being no hills-to be climbed or depressed by the myriads of particles passing horizontally, there could be no farther tendency to turn the disk upon the horizontal axis Y Y. This actually conforms to one of the gyroscopic laws which states that the precession ceases instantly upon the cessation of the impressed forces, upon the primary axis of tilt. Thus the phenomenon is entirely one of inertia of the rapidly revolving masses and is due wholly to Newton's first law that all matter resists being deflected from its path when once it has assumed a line of motion.

A Simple Analogy

The explanation which to the author is simplest consists in supposing that normally to the vertical axis X X there are mounted at equal distances from the center, two parallel gun barrels open at either end which persist in their location with reference to the axis X X, while the particles of the rapidly revolving disk flow through them. These are shown in Fig. 5, and the upper gun barrel may be marked A B and the lower one C D. The particles are assumed to be moving in the same direction as they did in Fig. 4—namely, with a clockwise rotation. Suppose now that the particles passing through these rifle barrels are rifle balls. If a rifle ball were fired through a second rifle barrel, open at both ends, placed immediately in front of and exactly in the same axial alignment, the ball would pass on through the second barrel almost as though it were not there.

If the second rifle barrel is hung by some elastic support so that it is free to move laterally in any direction and the axial alignment is changed so that one gun barrel is at a small angle to the other, but pointing directly into the adjacent end of the freely suspended second barrel, and a bullet is fired from one barrel through the other, the bullet will have to be turned aside from its original path in passing through the second barrel. It would resist this, and as it progressed farther and farther through the second barrel would constantly impinge upon the side of the bore during its progress, so the second barrel being perfectly free to move, would be pressed bodily in the direction of the original course of the bullet and would move as a whole. For purposes of additional illustration of gyroscope precession, this may be considered to be just what happens to the particles which have received a definite directive force in their travel when

they arrive at points A and C, and are now asked to deflect such course upon entering the rifle barrel C D and A B.

Suppose now that this pair of rifle barrels be lifted out of the disk and mounted, as represented by paper tubes in Fig. 6, and suppose the myriad of particles passing through them are air particles directed by the two electric fans. The little wire representing the axis X X which holds the two barrels is pivoted in the diamond-shaped central piece and by means of the small cord can be given a tilt in either direction as is plainly to be seen. This diamond-shaped support at the same time is pivoted crosswise or upon the line Y Y of Fig. 5, so that if the barrel A B be elevated and the barrel C D be depressed, a motion about axis, Y Y, will be developed and gyroscopic precession will be seen in the act of being developed, the phenomenon being adequately and beautifully illustrated.

By starting the fans and manipulating the cords, the two gun barrels A B and C D may be tilted so that

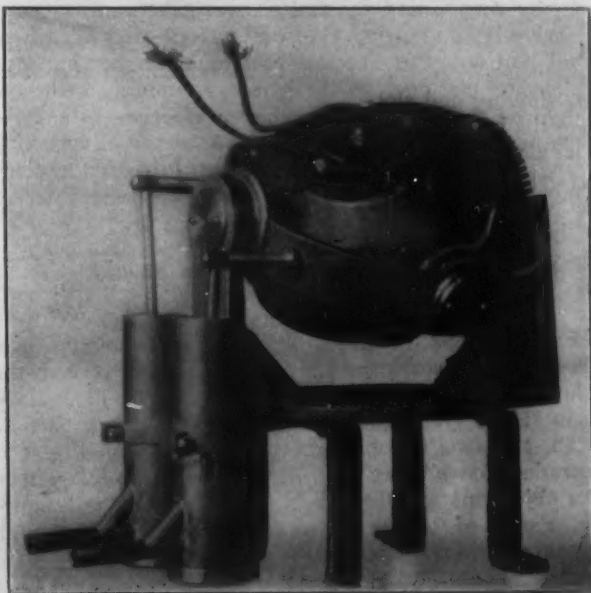


Fig. 11.—The Sperry Gyroscopic Coupling Which Increases the Precessional Velocities.

their ends B and C are depressed and their ends A and D, are elevated, as shown in Fig. 7, whereupon the tube A B instantly swings upward and the tube C D swings downwardly around the axis Y Y, as shown in Fig. 8. Upon reversing the impressed forces and depressing the ends A and D of the tubes, as in Fig. 9, a reverse motion takes place, the tube C D instantly swings up and the tube A B swings down around the axis Y Y, as shown in Fig. 10, thus showing the reversal of the gyroscope precession incidental to the reversal of the impressed forces about axis X X. Through the operations of this simple experiment the precessional forces are seen in the act of being developed, and the resulting motions start and proceed from their inception. The causes of the motion in this instance are perfectly apparent and of such a nature as to be unmistakable as to origin.

The Force of the Gyroscope

Now to consider the magnitude of these forces, having measured the velocity of the air and found it to be only 52 ft. per sec. In a steel wheel about 12 times this velocity is allowable and 6,000 times the weight of every particle traveling here; even with the air particles the reaction is clear cut and the resulting motions strong and positive. Think what they would be were the particles 6,000 times heavier and operating at 12 times the velocity, making 72,000 times the force here present in this pair of tubes, and again consider the number of rifle barrels or paths are multiplied almost indefinitely in the case of the wheel.

Some time ago the author enunciated one principle of the gyroscope which he has since been able to demonstrate and which should be almost axiomatic; that is, if 100 lb. is impressed upon the base ring D in Fig. 3 to swing it, 100 lb. can be taken from the precessional ring C to the normal. The amount of stress that is impressed in this one plane can actually be recovered in the other plane up to the breaking down point of the couple. This principle the author has applied in a more or less novel gyroscopic coupling which, it may be said, brings about a rather paradoxical reaction. This was exhibited in Europe last year, it having been pronounced new by those who have seen it in operation; it seems to multiply the precessional velocities by the $\sqrt{2}$ or 1.41 of the impressed velocities of the base ring. One form of application of this principle is shown in Fig. 11.

(To be continued.)

The New Manville Screw Shaver and Slotter

A recent product of the E. J. Manville Machine Company, Waterbury, Conn., is a combination machine for shaving and slotting the heads of machine and wood screws. It can also be used for either plain shaving or slotting, if desired, and has been developed as an accessory to the wood screw threading machine illustrated in *The Iron Age*, July 7, 1910, the two being intended to overcome the objections to older types of screw manufacturing equipment.

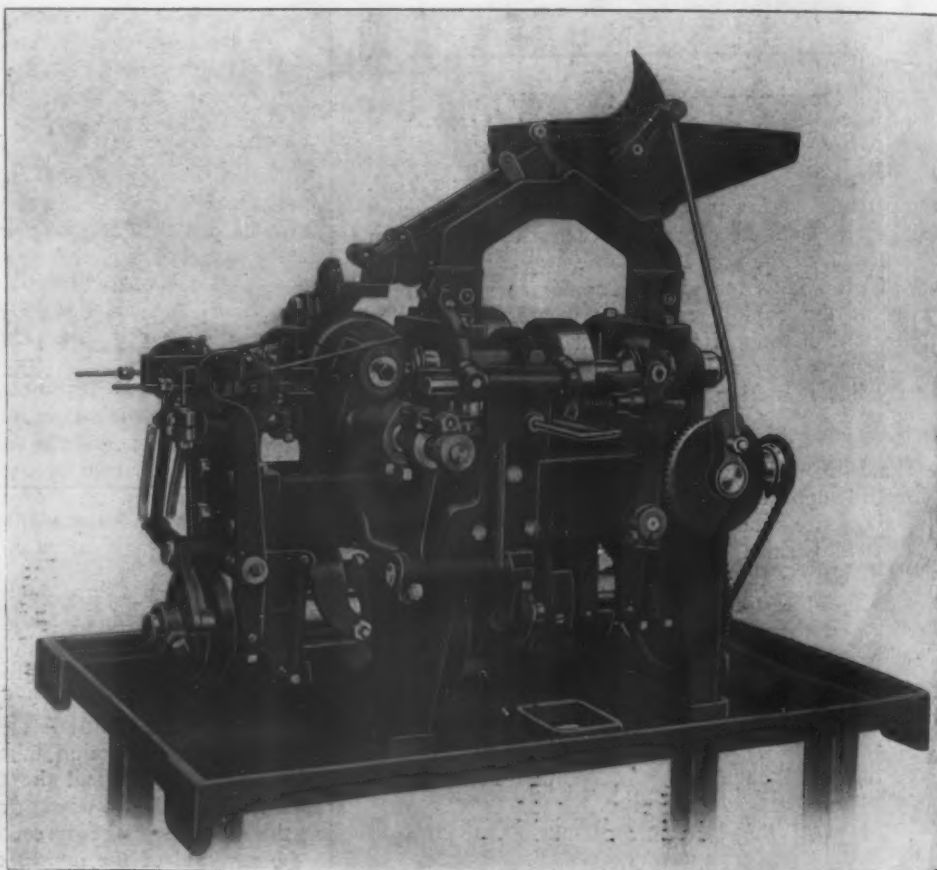
This new machine is claimed to form a head of the correct diameter, perfectly round and concentric with the body of the screw, and with the slot exactly in the center of the head. All screws up to 4 in. long, which is the maximum handled, are pushed into the spindle clear up to the head, and no back rest is used to throw out imperfect blanks. This feature of holding the screw in the spindle, while it is being turned and having the spindles rigidly mounted is claimed to insure every head being absolutely round and very smoothly finished. It is also said to increase the life of the tools and insure a greatly increased production, as no time is lost in turning the spindle over. A split chuck, very much like that used on an automatic screw machine, is employed to hold the blank, and the saws are mounted on a rigid bracket, which can be instantly adjusted to bring the slot in the center of the head.

The screws handled by this machine range from a No. 0, $\frac{1}{4}$ in. long, to a No. 20, 4 in. long. Two sizes of hoppers are furnished, which are interchangeable on this machine and also with the wood screw threading machine. Practically all parts of the machine are in

full view and almost every adjustment can be made while the machine is running. The manner of mounting the shaving tool is such that the tool can always be brought to the head of the screw at any angle, thus insuring a head with the correct angle even though the tool itself may not be correctly formed.

It is practically impossible to break any of the parts of this machine, as almost all the movements are yielding and some of them will give in both directions. Positive stops govern the action of all these movements instead of having cam faces bring the tools to their working points alone. It is said that any operator who is at all familiar with the older type of machine can easily run this new tool, as the action of the tools is practically the same in both, the only radical point of difference being that both spindles are mounted rigidly in the frame and each spindle has an individual set of tools. This is said to give extreme accuracy to the product, while the amount is increased, as no time is consumed in moving the spindles over from side to side.

The Budapest Exhibition.—Joseph Baneth, Budapest, Hungary, is now in New York, and until Decem-



A New Wood Screw Shaving and Slotting Machine Made by the E. J. Manville Machine Company, Waterbury, Conn.

ber 20 will make his headquarters at the Herald Square Hotel. He has come to this country to interest manufacturers in the International Exhibition "of novelties and patents of the iron and engineering industries," which will be held in the Industrial Palace at Budapest in May and June, 1911. The principal articles to be exhibited, as stated in the preliminary circular of the exhibition, are "iron ware, machines and apparatus for domestic use, industrial and agricultural plants; also motor engines. Construction and technical devices for manufacturers, inventions and novelties for shipping and in the military art will be admitted; models or designs or new heavy machines can also be exhibited." The exhibition will have the aid of the Royal Board of Trade of Hungary and the National Association of Hungarian Ironmongers.

The Brown Radiation Pyrometer

A Fixed Focus Instrument with High Temperature Range

A new type of radiation pyrometer has been designed by Richard P. Brown, which is claimed to embrace several new features and to be an accurate and simple instrument for measuring temperatures beyond the range of the electric pyrometer employing a platinum thermo-couple. This new pyrometer, which is being marketed by the Brown Instrument Company, 311 Walnut street, Philadelphia, Pa., is particularly adapted for measuring the temperatures in blast furnaces, open hearth steel furnaces, boiler furnaces, brick kilns and rotary cement kilns, where the temperature is about 3000 degrees F., and must be measured 20 ft. inside the wall. It is also valuable in research work and wherever high temperatures must be measured. Fig. 1 is a view of the instrument packed in a case for transportation, while Figs. 2 and 3 show it in use taking the temperatures of furnaces. In Fig. 2 the pyrometer is held in the hand, as only instantaneous readings of the different units making up a battery



Fig. 1.—The New Radiation Pyrometer Made by the Brown Instrument Company, Philadelphia, Pa.

are desired, and in Fig. 3 it is mounted on a tripod in front of one particular furnace.

In general the electric instrument will measure temperatures under 2500 degrees F. efficiency, but above that point the life of the thermo-couple is declared to be very short and the accuracy of the pyrometer impaired. The thermo-couple in a radiation pyrometer is located at the rear of the tube, and a concave mirror focuses the heat rays entering the tube upon the couple, which is connected to a milli-voltmeter with its scale graduated in degrees. No part of the instrument is exposed to the excessive heat which it measures and consequently the furnace gases or the heat cannot destroy its usefulness.

Two styles of radiation pyrometers are in general use—the adjustable and the fixed focus types. Those of the former type are said to possess the objection of being complicated, and former instruments of the fixed focus type had no means of indicating to the operator that he was not too far from the furnace, the proper distance being 10 times the diameter of the opening in the furnace wall. In the Brown instrument a finder similar to that of a camera is used. The tube can thus be pointed directly at the furnace, and the finder acts

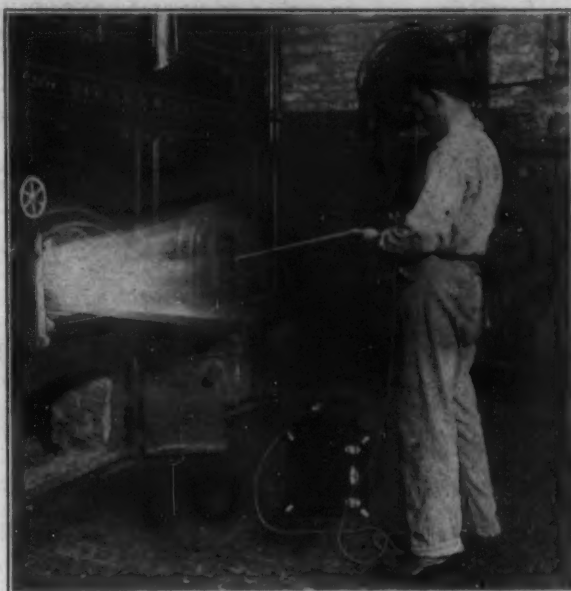


Fig. 2.—Taking the Temperature of a Battery of Furnaces with the Brown Pyrometer.

as a measure of the distance, for when the red reflection of the opening fills the entire field of the finder the pyrometer is at the proper distance.

The instrument has been calibrated for measuring the temperature of a black body or the temperature of walls and inside parts of furnaces that are practically black, and it is said that the graduations are accurate within 1 per cent. at 3000 degrees F. In measuring the temperature of molten metal or highly polished surfaces that reflect a correction has to be made for this reflection. A special feature of the pyrometer is the use of a collapsible tube, which enables the pyrometer tube, the indicator, the tripod and the wiring to be folded into a small leather carrying case that weighs about 15 lb. and is shown in Fig. 1. This makes the pyrometer especially adapted for being moved from place to place for testing.

It is frequently inconvenient, if long tests of a brick kiln or furnace are made with a radiation pyrometer, to leave the door open. For this purpose a firebrick tube

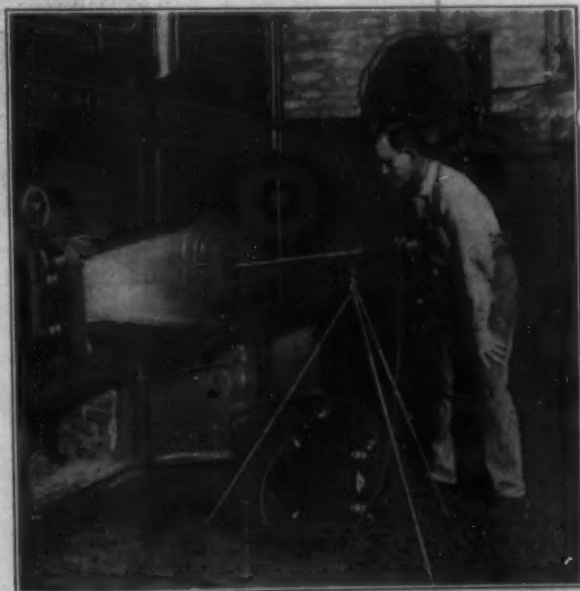


Fig. 3.—The Instrument Mounted on a Tripod for Prolonged Use in One Location.

is inserted in the opening in the furnace wall and projects into it, the inner end being closed. The pyrometer is then focused on the inner end of this tube and a bracket bolted to the wall is used to support it, instead of the tripod shown in Fig. 3.

The British Steel Maker's Ore Supplies*

Spanish, Swedish and North American Iron Deposits—Sources of Manganese Ores— The Place of Alloy Steels

BY W. H. HERDSMAN, GLASGOW.

I am not unmindful of the fact that our Institute was addressed some seven years ago by so eminent an authority as the late Bennett Brough on "The World's Iron Ore Supplies," when interesting facts and figures were put before you. A discussion followed, showing a general concurrence of opinion that, while the ever-increasing drain on the known and available deposits of Bessemer ores is a matter for some anxiety to acid steel makers, there need be none regarding the supply of the various grades of phosphoric ores suitable for foundry, forge and basic iron and steel purposes. From neither of these conclusions do I propose to dissent, though the world's production of iron has in the interim increased by 50 per cent. to some 65,000,000 of tons annually. Avoiding, as far as possible, figures and statistics which are available to all, I shall base my remarks rather on my personal views and experience as an analyst, metallurgist and mineral expert, closely associated with the development of the iron, steel and ore industries during the past 35 years. In addition to the ores of iron, I propose to include in my survey the other ores required by the steel maker to-day, especially those of manganese.

Three Classes of Iron Ores

My experience has led me to place all iron ores in three classes:

1. Those formed by chemical action by replacement or precipitation from ferruginous solutions derived from primary rocks or pre-existing deposits, the iron being deposited as nonhydrated oxide (red hematite) or as protocarbonate (Spathic ore), the latter generally more or less oxidized by weathering subsequently to hydrated brown hematite (limonite, &c.). Our West Coast hematites belong to the first division; the Bilbao deposits are the best known examples of the second. The nonphosphoric magnetites are also of this class, subsequently metamorphosed by thermal action. All the low phosphorus ores (other than those of Class 3) are included in this class, but it also includes numberless minor deposits of varying phosphorus contents outside the Bessemer limits (that is, above 0.06 phosphorus), but generally much lower than the phosphoric ores proper.

- All ores of this class containing phosphorus are of (geologically) recent formation or exposure, and are found at or near the surface, the phosphorus contents being accidental. The class itself is essentially non-phosphoric. They are from the nature and circumstances of their genesis of most varied and irregular form and size; often they are extremely deceptive in their surface indications to those unacquainted with their character—this fact having led in the past to enormous sums of money being wasted on the acquisition of ore properties which have proved on working to be little more than surface crusts and knobs.

2. The second class of iron ore deposits are those which are found regularly stratified in sedimentary rocks. These ores are phosphoric without exception and will be dealt with later when I come to speak of the phosphoric ores.

3. The third class includes all those of direct volcanic or Plutonic origin, and all are essentially non-phosphoric ores. Representatives of this class within the range of my review are the aluminous-titaniferous

ores of Antrim and the chromiferous iron ores, containing some nickel, occurring in Greece and in Cuba. The titaniferous magnetites of Norway, though not at present regarded as ores of iron, belong also to this class.

Low Phosphorus Ores

Of the Bessemer or acid process ores we now import some 8,000,000 tons annually to supplement the 1,750,000 tons raised in this country, to supply the acid steel maker. Our imports are derived principally from Spain, both north and south, the iron ore exports of which country we share with Germany, Belgium, France and, to an increasing extent, with the United States. Algeria, Greece, Norway and Sweden furnish the greater part of the balance of our wants, and Tunis is expected, in the near future, to become an important contributor, while in times of high prices and (or) low freights, ore flows to us in a not inconsiderable stream from the distant South Russian mines of the Krivoi Rog district via the Black Sea port of Nicolaieff. Of the Spanish mines, those of the Bilbao district have furnished our main supplies for fully 30 years, and continue still to do so, though both quantity and quality steadily decline. They were long ago considered to be approaching exhaustion, and their life has been fixed periodically since 1882 at "another 10 years." Now Don Joaquin Arisqueta and Don Julio de Lazurtegui, than whom there can be no better authorities, estimate the remaining ore at 70,000,000 tons, and their life, with a continually decreasing output, at 25 to 30 years. Of the other mines in the north of Spain supplying this class of ore, the district of Santander produces 1,500,000 tons annually, and by those on the spot is expected to continue that output for fully 20 years.

In the south of Spain the districts served by the ports of Almeria, Aguilas, Seville, Carthagena, Garchuca, Malaga and Marbella, in the order of importance given, yield an annual supply of about 3,000,000 tons, while on the east coast the mines in the province of Teruel, shipping at Sagunto Port, yield a further 500,000 tons annually.

All these districts, with the exception, possibly, of Seville, may be expected to continue their present output, and in several instances to considerably increase it, for periods of not less than 25 years; and I think we may safely assume that the increasing supplies from the south of Spain, together with the expected large increase from Tunis, will more than compensate for the dwindling Bilbao yield, and maintain the supplies likely to be required for the acid process for the next 25 years or more. The time will be influenced by the development of the Tunis deposits and by any discoveries which may be made along the Mediterranean seaboard, including the long coast line of Asia Minor, which, under the new Turkish régime, may now be expected to become more accessible to mining enterprise. My own opinion is that while these shores will contribute in the future a considerable aggregate to the world's ore requirements, the phosphorus contents will generally be found to be above Bessemer limits.

THE ACID PROCESS DOOMED TO EXTINCTION.

Another factor which may appreciably prolong the life of the acid process is found in the siliceous hematites and magnetites of Norway. If these can be successfully and economically separated from the gangue,

* A paper read before the West of Scotland Iron and Steel Institute at Glasgow, October 21, 1910.

and the concentrates shipped to this country, they would furnish, when briquetted with the soft ores of the south of Spain and of Teruel, a high grade smelting ore, without which the acid process cannot continue to exist. Unfortunately, the first attempt in Norway under British auspices to solve this problem has not met with conspicuous success, and the outlook in this direction is not promising. There can, I think, be no doubt that the acid process has maintained its existence so far since the genius of Sydney Thomas showed us the way to use phosphoric ores for steel making, because of the large quantities of rich ores which have hitherto been available, and the blast furnace economy attending their treatment. Now, however, acid ores are steadily falling off in their iron contents, while, since the supplies from Narvik and Wabana became available, the supply of basic ores is increasing, so that unless some important new discoveries are made within the radius available for our markets, the acid process is doomed to extinction or to share with the puddling furnaces in quiet retirement the memories of past glories.

I introduce these considerations here to maintain my contention that there need be no apprehension felt on account of approaching scarcity of low phosphorus ore, while, as I hope to show, the reserves of all other classes of iron ore yielding the necessary metal are practically inexhaustible.

Seeing that the two processes now march side by side, there is no reason to anticipate any disturbance of the economic situation by the eventual disappearance of the acid process. Before leaving the subject of acid ores, I should, perhaps, say that being personally acquainted with both districts, I do not regard the south Russian ores as permanent reserves available for our use, though they may continue to be shipped to us for some time longer; nor do I look on the Brazilian iron ores as within our zone of supply, though, possibly, under the conditions which influence the Russian supplies, cargoes of the best class of the Minas ores may find their way here eventually.

Phosphoric Iron Ores

These, the world's primary ores of iron, have been formed by separation of the metal from solutions derived from the primary rocks of the earth's crust, through the agency of animalculæ, bacteria, or other micro-organisms which have so continued active in our service, from the first dawn of life on our globe, through all the long geological ages to the present day; a period of time so vast as to rank with astronomical distances in one's inability to grasp it, yet the iron ore now being formed in some of our bogs to-day is of similar origin to that coming to us from remote Cambrian or Silurian times. These deposits, found in their original stratified form, constitute our great store of the metal for future use, and will be found to be practically inexhaustible.

The phosphoric ores constitute the greater proportion of our own native ores, as is the case in Germany, France, Luxemburg, Spain, and, indeed, in every country retaining its original sedimentary strata.

We have iron ore beds in North Wales, now being worked, which were laid down for our use in Cambro-Silurian times, and others in Wiltshire and at Dover which have existed only from the Cretaceous period, but the conditions most favorable to iron ore deposition in this part of the world appear to have occurred during intermediate geological times, so that we find our main deposits of this class of ore in Cleveland, Lincolnshire, and Northamptonshire, in the Lias and Oolites of the Jurassic group.

The Minette ores of Germany, Luxemburg and Northern France, which together are estimated to contain not less than 10,000,000,000 tons of workable ore, thus furnishing a supply to their respective countries, at the present rate of consumption, for fully 300 years,

belong also to the Jurassic age; while the bedded phosphoric ores of Spain in the stratified measures of the northern provinces, of greater geological age, amount, according to Mr. Lazurtegui, to hundreds of billions of tons.

Going somewhat further afield, but still within the zone from which we at present draw our supplies, we find, in Tertiary measures outcropping on the shores of the Black Sea, bedded ores of the same class, 30 to 50 ft. thick, and estimated to contain at least 1,000,000,000 tons. These were recognized by the late Professor Le Neve Foster as probably of more importance to Russia than the rich deposits of Krivoi Rog. An attempt was made a few years ago to utilize these ores, and blast furnaces and basic Bessemer plant were erected near Kertch. The ore was mined by continuous bucket dredges, loaded direct into wagons and briquetted by simple pressure, dried and conveyed to the blast furnace (fuel being obtained from the Donetz district, shipped by the Sea of Azov), making an excellent basic pig. The works, however, at the time of my visit had stopped for want of capital, and much of the pig iron then made eventually found its way to this country.

NEWFOUNDLAND AND NOVA SCOTIA DEPOSITS.

Crossing the North Atlantic to our own colony of Newfoundland, we find at Bell Island, in Conception Bay, numerous beds of phosphoric iron ore outcropping on the island and dipping at a low angle to the north—the small segment of a trough of ore deposition, the limits of which have not yet been determined, but which already proved and worked more than a mile from the shore, shows it to be one of the most extensive and valuable deposits of phosphoric ore within our sphere of interest. The quantity of ore recoverable within submarine working limits must amount to hundreds of millions of tons, and may reach thousands of millions.

A boring made last year, at the time of my visit, from the farthest point of the submarine area reached, showed five workable seams of ore, totaling some 35 ft. in a depth tested of 370 ft., the beds being separated by partings ranging from 12 to 200 ft., thus showing a frequent recurrence of the conditions favorable to iron ore deposition over an extended period of time, with very irregular intervals, and suggesting the probably great lateral extent of some, at least, of these ore beds, making the further development of this mine of extreme interest.

The geological horizon in which these ore beds are found appears to be near the base of the Silurian measures, which with their Cambrian complements outcrop on Bell Island and the southern shores of Conception Bay.

The iron contents of these beds is high and remarkably uniform, varying only from 47 to 53 per cent. in the several beds in the above-mentioned boring, while the shipments over many millions of tons have averaged over 50 per cent. with great regularity, with 1 per cent. phosphorous and low silica. The ore of the surface beds possesses the remarkable property of natural rectangular cleavage, so that the quarries in which it is mined appear to be full of bricks; this property disappears largely in the submarine workings, though traces of it are occasionally met with even at considerable distances from the shore. The ore from the quarries, together with that drawn by inclined planes from the submarine workings, is carried across the island, some two or three miles, by several endless rope railways, to the two shipping piers on the south and sheltered side of the island, where it is tipped into large bunkers and loaded from there by an endless chain of buckets at the rate of about 1500 tons per hour.

Another of these bedded phosphoric ores has recently been shipped to this country from the Annapolis

district of Nova Scotia. It is higher in phosphorus than the Wabana ore—the cargo under my notice having given 1.5 per cent. It is, however, higher in silica, and is practically identical in composition with the Careg Fawr ore of North Wales previously mentioned. Two beds, at least, of this ore appear to exist in Nova Scotia, apparently of upper Silurian or Devonian age, but, unfortunately, the beds have suffered, in parts at least, considerable disturbance by earth movements and igneous extrusions, which have broken their continuity. There is, however, every probability of undisturbed areas of these beds being found to exist in the province, in which case they must become a source of wealth to the Colony, and an available supply of high phosphorus ores to ourselves of considerable importance, being very conveniently placed for shipment.

SWEDISH DEPOSITS.

Of other present sources of phosphoric iron ore available for our use the only remaining deposits of importance are those of Northern Sweden, *i. e.*, Kiruna, Luossavaara, and Gellivara, which are already proved to contain many hundreds of millions of tons, without the limits of the ore having been reached. The ore is now well known to all of us, and is found in the bunkers of every iron and steel works. It is an ore differing widely in its appearance and iron contents from the Wabana ore, but is, in my opinion, of precisely similar origin, though it has since been completely metamorphosed by igneous action, which has brought the ore into a state of fusion and "slagged off" the greater part of the silicious contents into the surrounding crystalline rocks, retaining, however, the whole or greater part of its phosphorus contents. It is a rich ore, cheaply mined, but handicapped by a long railroad transport to the shipping port; however, large steel hopper wagons, a heavy rail bed, powerful locomotives, and the most modern shipping arrangements, enable large quantities to be dealt with in the most economical manner, so that when this country has definitely accepted the basic process, it is to Narvik and to Wabana and Nova Scotia that it must look for its main outside sources of supply. The west coast ports of this district are most favorably situated for Wabana and Nova Scotia, and Grangemouth equally so for Swedish deliveries.

This concludes my review of the phosphoric ores at present available to the British steel makers, though other Wabanas will, and other Kirunas may, be found within the radius of transport to our shores economically possible, there being much of Newfoundland but imperfectly explored, while the whole coast line of Labrador and of the great Hudson Bay is still *terra incognita* beyond the narrowest fringe of shore.

In the accompanying table are analyses of phosphoric iron ores, as well as of chromiferous ores referred to in this paper:

Redded Phosphoric Ores.

	Of Cambro-Silurian age.				Of more recent geological age.	
	North Wales.	Nova Scotia.	North Spain.	Wabana.	Dover (Cretaceous).	Kertch (Tertiary).
Iron	45	48	49	50	30 to 40	30 to 45
Silica	18	15	20	9	10 to 15	12 to 18
Phosphorus	1.6	1.5	1.5	1	0.4 to 0.6	1 to 2
Lime	4	4	2	3	3 to 10	2 to 6
Alumina	6	6	3	4	5 to 8	4 to 6
Manganese	low	low	low	low	low	0.5 to 5.5
Sulphur	generally low	low	low	low	low	low
Moisture	generally low	low	low	low	variable, but much higher	low

Iron Ores Containing Chromium and Nickel.

	Greece.	Cuba.
Iron	47	46
Chromium	2.5	1.7
Nickel	0.6	0.5
Silica	10	6
Phosphorus	0.025	0.015
Lime	1	low
Combined water	5	13
The above are in the dry ore.		
Moisture, per cent. as mined	3	30

I may mention here that the Clinton and Flax Seed

ores of the United States, which must form the main future iron ore reserves of that country, are of the same regularly stratified type of primary phosphoric ore as the Wabana and others elsewhere, which I have mentioned.

Manganese Ores

Turning now to the ores of manganese, increasingly necessary to the steelmaker, I propose to confine my remarks to the present chief sources of the ores of that metal supplying this country.

Though manganese is one of the most widely disseminated of the metals, the important concentrations of it, forming high grade ores, are rare, and we have to go far afield for any considerable supply of such mineral. As is well known, Russia, India and Brazil practically supply not only our own needs, but those of the whole metallurgical world, minor supplies being furnished by Spain, Greece, Turkey, Cuba, Chili, &c. The demand for this ore for a number of years, while continually growing, has been somewhat erratic, and prices have fluctuated greatly in consequence, the supply, however, being now in excess of the demand, since the Indian deposits were exploited. It may be expected that more settled conditions will prevail.

Of high grade ores, those of the Russian Caucasus, though confined to one district at present, hold probably the greatest reserves of the mineral, this being due to their definite bedded character. The ore bed, it is said, can be traced for 75 miles. It retains its horizontal position to a great extent undisturbed, and at the present rate of production will not be exhausted for several centuries. The average quality exported of recent years has contained 47 to 50 per cent. manganese, 10 to 12 per cent. silica and 0.14 to 0.18 per cent. phosphorus.

Next in point of importance to the Russian are the Indian deposits, which are found widely disseminated over that great peninsula. The Madras deposits, the first sample parcels of which passed through my hands, were first worked in 1892, and have continued to yield increasing supplies annually since that time. This ore, however, is somewhat phosphoric and ferruginous and mostly unsuitable for making 80 per cent. ferro-manganese. It was not until the numerous and important deposits of higher class mineral in the central provinces began to be mined and exported, at the beginning of this century, that the Indian supplies of this ore became of real importance, and other workable deposits, being subsequently found in Central India, Bombay and elsewhere, the annual production rose to over 500,000 tons, which amount can be doubled or quadrupled if necessary, when the various fields have been supplied with adequate rail transport and the shipping facilities have been organized on modern lines.

I do not propose to attempt any description of the several fields and the numerous individual deposits, as all this can be found by any one interested in the remarkable and monumental monograph on the Indian manganese ores prepared by the able assistant superintendent of the Geological Survey of India, L. L. Fermor. The reserves of manganese ore available for the future in India are naturally at present practically impossible to forecast, even if all the existing deposits were known, which is improbable.

Mr. Fermor has estimated that the known deposits at the then rate of production may be expected to be exhausted in 30 to 50 years. Without the advantage of the intimate acquaintance with the deposits which Mr. Fermor must have, I have yet had opportunity of inspecting typical deposits of almost every district in India, and differing as I do from him as to their genesis in certain cases, I am of opinion that their extent and importance have been very greatly under-rated.

The Brazilian deposits have for many years yielded us a supply of the purest manganese ores, rich in metal,

and extremely low in silica, iron and phosphorus, from the mines of Miguel Burnier, which were the first to be worked in that country. The ore, however, from the bed furnishing these supplies has proved with the deeper working of the mine to contain an excessive proportion of small and to be unusually hygrometric, cargoes of the ore having yielded over 20 per cent. of moisture. Since I last visited this mine I understand a briquetting and calcining plant has been erected to enable the mineral to be shipped in a dry condition; but I have, at the time of writing, no information as to what measure of success has attended its installation. This Miguel Burnier ore is unique in its character and quality, the deposit in no way resembling those of Russia or India.

Other Brazilian manganese ore deposits of ordinary type occur, and have been extensively worked, in the State of Minas, and also in Bahia, while important deposits of this mineral are said to occur in Matto Grosso, but the ore has not, I think, as yet found its way into the market. The known ore deposits, together with fresh discoveries which may be expected to be made in the vast territories and littoral of that great country, will undoubtedly enable Brazil to maintain if not improve its position as a manganese producer for a long series of years to come.

Of other of our sources of manganese ore, the picturesque mine of Covadonga in Northern Spain alone rivals the Brazilian ore of Burnier in its richness and freedom from phosphorus, while Turkey, Greece and South Russia all produce ore of a lower grade, much of which can only find a market in times of great demand.

Ores of Nickel, Chromium, Tungsten and Vanadium

I need only briefly refer to the other metalliferous ores required by the steel maker, which include nickel, chromium, tungsten, vanadium and molybdenum. Those of chromium and molybdenum alone have come under my personal notice professionally abroad. For our nickel supplies we depend, as you know, chiefly on that coming to us in the form of the silicate "garnierite" from New Caledonia, and that found as nickeliferous pyrrhotite at Sudbury, Canada, while minor supplies come from numerous sources elsewhere abroad. In considering the future of nickel steel, it must not be forgotten that the supplies are limited and that the steel maker must compete with the nickel plater and many other of our craftsmen for their possession.

Of chrome ores, in their mineral origin very closely related to the ores of nickel, there is a much greater but still limited supply, and for those of high grade (35 per cent. chromium and upward) the chemical manufacturer is a formidable competitor. Turkey, New Caledonia, Australia, India, Canada, Rhodesia and many other places yield supplies of this ore, the mineral being more widely distributed in appreciable quantities than nickel. In the event of chromium being required by the steelmaker in greater quantity, there are large reserves still available, but the cost of transport will always maintain the price of these ores at a high level.

A much cheaper source for the steelmaker, when the problem of their reduction has been solved, lies at hand in the iron-chrome-nickel ores which, as already mentioned, are found by hundreds of millions of tons in Greece and Cuba, and other chromiferous iron ores in Tasmania and elsewhere.

Tungsten, vanadium and molybdenum are all of rare occurrence in nature, and we have no reason to believe that they will ever be otherwise, so that their use must be confined as at present to limited amounts in special steels. Tungsten is one of the heavy metals, representing nature's final efforts when fashioning the elements, and when alloyed with steel in small quantities imparts remarkable hardness and magnetic qualities. Its chief ores, wolfram and scheelite, are found in veins and pockets in the primary rocks, and its sup-

ply will depend on the extent to which general mining operations are carried on in such rocks, but it can never be plentiful. The same remarks apply to the mineral molybdenite, the chief source of molybdenum, our supply of which is derived principally from workings in the granites and gneisses of Norway.

Vanadium is a scarce metal of quite another kind, which owes its present distribution on the earth's surface, like iron and manganese, to its solubility in ordinary waters. Traces of it are comparatively widely distributed. It is found in our Jurassic iron ores, having been noticed in those of Cleveland and Wiltshire. Its ores are, however, of somewhat rare occurrence, and the steelmaker is at present dependent mainly on supplies from distant Peru, where veins of a rather uncommon mineral, "asphaltite," appear to have captured and fixed a considerable quantity of this too soluble and elusive metal. It is interesting to note that these deposits occur also in sedimentary rocks of Jurassic age.

Higher Grade Steels to Come Into Use

This concludes my review of the ore supplies, to which I now propose to add a few remarks and reflections on the future of the steel industry as suggested by the above consideration of our supplies of the raw materials. Without trespassing on the province of Messrs. Wells and Kipling, I think I may venture to say that the age of steel, that is, carbon steel, has reached its zenith, and that progress, in the guise of our leading engineers, calls urgently for a new or improved metal for many industrial purposes. I do not suggest that we are on the eve of any sudden or great metallurgical revolution; the change will be gradual and unnoticed, as is the steady replacement of acid steel by that of basic manufacture now going on, for iron must, I think, remain the base of the coming alloys within that period of the future with which we have any present concern.

These premises and others, which I shall shortly enumerate must all influence our calculations when we attempt to estimate the rate at which our ore supplies may be expected to be drawn on in future, and the probable direction in which our steel industry may be expected to expand. The other considerations I have in mind are the effect which will be produced on our trade by the development of the iron and steel works already established in Canada and India, and those which will follow in the near future in Australia, New Zealand and others of our colonies possessing the necessary mineral supplies.

China, possessing these supplies in unusual abundance, may also soon be expected, either alone or under Japanese tuition, to establish her own steel industry and become an active competitor in the Eastern markets.

The rapid extension of the use of ferro-concrete must also make its effect felt in reducing the demand for much structural metal which it replaces.

Then there is the ever-increasing amount of scrap metal returning to be used again. This in railroad metal alone must already be a considerable item—though I know of no statistics available on the subject—and in the future, with the spread of railroads and of steel works over the earth's surface, must become still more so. The extent to which the present drain on the iron ore resources may be relieved in being shared by other metalliferous minerals, depends evidently on the course of invention and discovery, which cannot be foretold. We have practically reached the limit of usefulness to which steel and our other present constructive metals can be applied, and we await the advent of the man who will lead us on our way to the next stage in the world's advancement.

MANGANESE AND NICKEL-CHROME STEELS.

It is very evident that any metal which is to share the future burden with iron, must itself be available

in sufficient quantity. I have endeavored to show that the ores fulfilling this condition are comparatively few, and that manganese easily stands first, with its very large supplies of manganese and manganiferous iron ores of every possible grade, since the available supply of the manganiferous iron ores immeasurably exceeds those I have reviewed of the richer class of ores of this metal. Hadfield, more than 20 years ago, surprised the metallurgical world with the announcement of the wonderful properties of steel when alloyed with 10 to 15 per cent. of manganese, but this manganese steel, acclaimed by Pourcel as the "King of Metals," has remained in comparative obscurity, and of greatly restricted use, because of certain difficulties of manufacture and treatment, which no one seems to have made any serious effort to overcome.

It remains a costly metal for special uses only, made from the most expensive of manganese ores and alloys, because no one apparently can yet be found with the genius necessary to control the carbon contents of the various manganese-iron alloys. Is it not time that some voice more influential than mine should again be raised to cry "Wake up, Britain!" if we are to maintain our position as leaders and pioneers in the metal world? Steel alloyed with chromium and nickel, either together or separately, has proved to have valuable qualities, and if by direct reduction the great stores of the three metals present in the ores of Greece and Cuba, already referred to, can be utilized, such steels can be provided in considerable quantities and at much cheaper rates than at present.

The success said to have attended recent experiments in alloying steel with Monel metal (a nickel-copper alloy), suggests that the division set up between iron and the non-ferrous metals may shortly have to be removed, and copper may be called to our aid to provide the necessary ferrous alloys of the future. As copper is a metal very widely distributed in nature, and is becoming more plentiful every year, with fresh discoveries constantly made, there may be found much useful work for it among the ferrous alloys.

There remains only aluminium among the commercially available metals to be considered. This metal, the ores of which are provided by nature in the greatest abundance, seems destined in the future to play a more important part in the metallurgical world, and we frequently hear of alloys of aluminum which are to "replace steel," the latest, announced quite recently, being "Duralumin," which, however, has yet to make good its claim.

The true significance of the magnetic qualities possessed by Heusler's alloy of manganese, aluminum and copper may not yet be apparent, but it at least suggests that these metals, together with iron and nickel, form a quintet meriting the very careful attention of our experimental metallurgists.

To those of our younger members furnished with a modern technical training and imbued, as they must be, with ambition and enthusiasm for their work, I commend these several problems, the material prizes for the solution of which are of no mean value, while the names of those who succeed will go down to posterity with those of Bessemer, Siemens, Thomas and others, as men who have shown themselves leaders in the march of progress, worthily upholding their country's fame.

The Woodward Governor Company's New Quarterly.—The Woodward Governor Company, 201 Mill street, Rockford, Ill., has commenced to issue a new quarterly house organ, entitled *Power Control*. The first number has 16 pages and contains matter of considerable interest to electric plants, cotton, paper and textile mills and all users of water power in general. A brief historical account of the organization of the company is given and attention is called to the necessity of using water wheel governors. There is a brief

description of the plant of the Park Rapids Mill & Elevator Company, Park Rapids, Minn., where a type C Woodward compensating governor is installed. A new type of relief valve for pipe lines is described and completes the quarterly.

The Stana R Adjustable Reamer

The Standard Tool Company, Cleveland, Ohio, has recently added to its line a new adjustable reamer, known as the Stana R. This tool is said to have been brought out in response to a growing demand for an adjustable reamer that is simple in construction, readily adjusted to compensate for wear and at the same time solid enough to stand the most severe service. These features are claimed to be developed to the highest degree in this reamer, which is made in both the hand and the shell types with either carbon or high speed steel blades. Fig. 1 shows the shell type of reamer, while Fig. 2 is a view of the hand type.

The body of the reamer is made of hard, tough machinery steel, and the blades are unequally spaced around its circumference which prevents chatter and

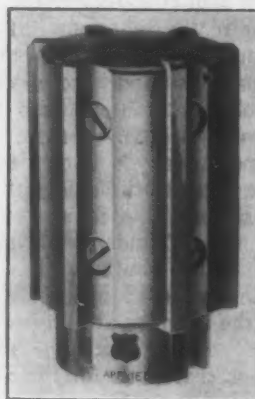


Fig. 1.



Fig. 2.

New Stana R Shell and Hand Reamers Made by the Standard Tool Company, Cleveland, Ohio.

insures a smooth hole. Each blade is held rigidly in place by heavy screws, having specially shaped heads that are countersunk into the body of the reamer deeply enough to prevent them from being loosened or damaged by accidents. The screw heads engage in V-shaped slots that are milled into the face of each blade. This construction not only seats and holds the blades rigidly against the bottom and back of the slot in the body, thus eliminating any tendency to spring, but it is claimed prevents absolutely any endwise motion.

After the blades are worn and need to be reground or when it is desired to increase the cutting diameter the blades can be taken out by removing the screws, and the diameter increased by placing a liner of some suitable material and the desired thickness, preferably tin foil, evenly in the slots under the blades, after which the reamer is ground to size in the usual way. The blades can also be ground with end clearance for chucking or machine reaming, as they extend a sufficient distance beyond the body to permit this being done. As will be seen, the blades can be adjusted many times. When completely used up the substitution of a new set of blades makes a new reamer to all intents and purposes.

Nutter & Barnes Metal Cutting-Off Machines

Rapid and Economical Production Characterizes the New Types

Two new machines for cutting metal have been developed by the Nutter & Barnes Company, 326 A street, Boston, Mass., and are illustrated herewith. Fig. 1 is an 8-in. metal saw cutting-off machine and Fig. 2 shows an elastic wheel metal cutting machine.

The special advantages claimed for the former machine are a large drip pan surrounding the base and an oil reservoir of ample size inside. The drive is of the central spur gear type throughout and all the driving gears and shafts, with the exception of the main driving gear wheel and the back gears, are of forged crucible carbon machinery steel. The main driving gear is 18 in. in diameter and has a $2\frac{1}{2}$ -in. face. The gears connecting with the saw spindle are of 5 pitch, have a 4-in. face and run in phosphor bronze bushings. The saw spindle is 3 in. in diameter and 16 in. long. Its nose measures $1\frac{3}{8}$ in. and there are four $\frac{1}{2}$ -in. driving pins.

The feed drive is of the combination sprocket chain and gear type with four changes, ranging from $\frac{1}{2}$ to 2 in. per minute. The gears furnishing the changes are contained in a gear box that is mounted on the feed brackets at the rear of the machine. The sprocket on the feed driving shaft is located between two friction disks, which normally hold it in place, but will allow it to slip if too great a load is applied to the feed or the stop is not set to trip at the right time. A foot lever at the front of the machine, which is not shown, engages the feed, and the treadle rod connected to the lever extends through to the rear of the machine near the oil supply tube and operates on the worm shaft meshing with the feed worm wheel.

The maximum capacity of the work shoe, which is 30 in. from the floor, is 8-in. round stock, but by removing this shoe, a bevel gauge can be used on the

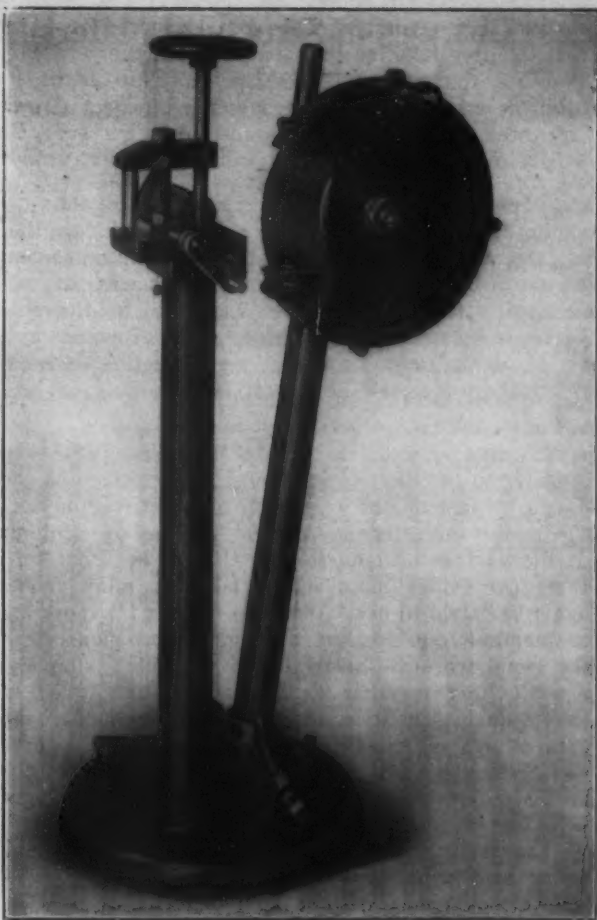


Fig. 2.—The Nutter & Barnes Elastic Wheel Metal Cutting Machine.

Width of carriage, inches.....	17
Movement of carriage, inches.....	9
Height of work shoe from floor, inches.....	30
Diameter of saw, inches.....	22
Thickness of saw, inch.....	$\frac{3}{16}$
Depth of cut, inches.....	8
Number of speeds.....	2
Size of plain table, inches.....	$18\frac{1}{2} \times 13$
Diameter of countershaft pulley, inches.....	14
Face width of countershaft pulley, inches.....	$4\frac{1}{2}$
Floor space, inches.....	30×58
Net weight, pounds.....	2,500
Shipping weight, pounds.....	3,000

Two saw speeds are available from the two-step cone pulley, and if this is not used, the back gears provide the same number. The diameters of the cone pulley steps are 10 and 12 in. respectively and the face width of both is $3\frac{1}{2}$ in. The regular equipment of the machine includes one 22-in. saw, an oil pump for supplying lubricant to the saw and a stock support with an adjustable screw elevation, as well as the tools usually supplied.

The metal-cutting machine shown in Fig. 2 is designed to cut off pipe and tubing 3 in. or less in diameter and solid pieces up to a maximum diameter of $\frac{3}{4}$ in. It is said that the material can be either hard or soft steel, and that the harder it is the better. The cutting is done by an elastic wheel, 12 in. in diameter and 3-32 in. thick, which runs at a speed of 3,000 rev. per min., bearing against the material which is held stationary in the V work shoe. This is claimed to be a decided advantage, especially on long pieces.

It is stated that this wheel does not require any sharpening and is swung forward for cutting by either the right or left hand or foot, as both a handle and a treadle are provided. The spring attached to the treadle returns the wheel to its idle position when the cut is completed.

Furnace A of the Tonawanda Iron & Steel Company, Tonawanda, N. Y., went out of blast November 19 for relining.

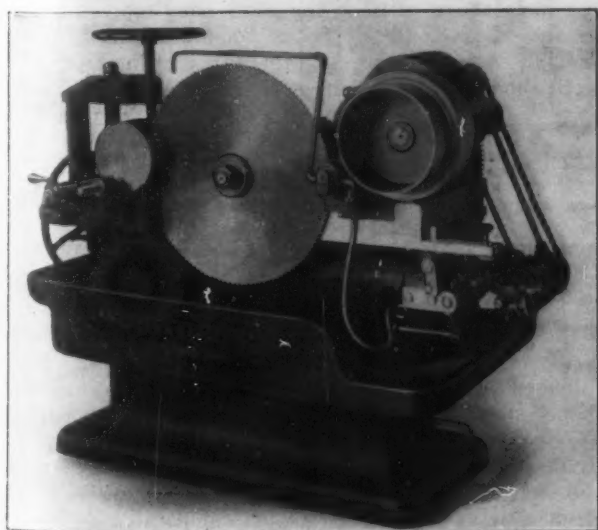


Fig. 1.—An 8-In. Metal Saw Cutting-off Machine Made by the Nutter & Barnes Company, Boston, Mass.

plain table for cutting flats, squares and structural shapes at an angle.

The principal dimensions and specifications of the machine are given in the following table:

Face width of saw spindle gears, inches.....	4
Pitch of saw spindle gears.....	5
Diameter of saw spindle, inches.....	3
Length of saw spindle, inches.....	16
Diameter of main driving gear, inches.....	18
Face of main driving gear, inches.....	$2\frac{1}{2}$
Ratio of back gearing.....	43 to 1
Length of carriage, inches.....	22

Heat Changes in Structural Materials

Relation of Temperature to Tensile and Compressive Strength

James E. Howard, engineer physicist, Bureau of Standards, Washington, D. C., read a paper before the National Association of Mutual Insurance Companies at Peoria, Ill., September 28, 1910, which was part of a general discussion on "Fire Waste and Its Prevention." In introducing the subject, Mr. Howard said that to obtain exact knowledge on the action of heat on building materials as a basis for judging of the

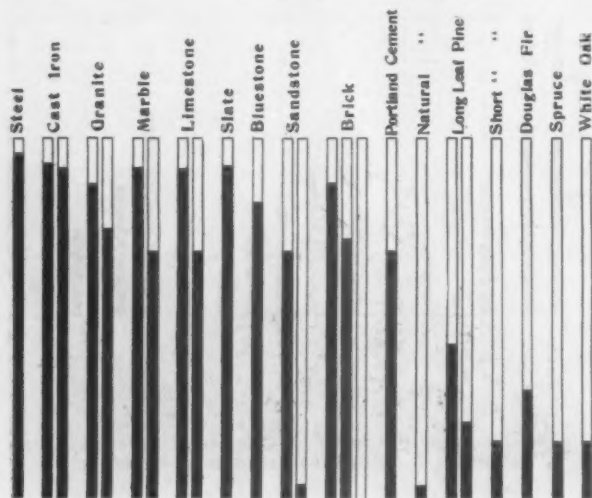


Fig. 1.—The Relative Rigidity of Structural Materials.

manner in which losses or injury may be averted, involves a large amount of laboratory work and the collection of data through the careful observations of insurance authorities. From the portion of the paper in which comparisons are made between steel and cast iron on the one hand, and other building materials, we make the extracts below. Mr. Howard also gives diagrams and comment bearing on the relative permanent expansion of different building stones after heating to a temperature of 400 to 440 degrees F.; the loss in water and carbon dioxide, of ground hydrated cements when heated to different temperatures, and the heat conductivity of Douglas fir:

Progressive Effects of Heat on Strength

It is recognized that heat is capable of destroying the integrity of any and all structures, but that each of the materials of construction is capable of enduring in some degree exposure to high temperatures, and that a study of their physical properties under conditions which may be encountered is essentially the foundation on which intelligent efforts for the prevention of fire losses must rest. The first manifestation which is noticed when a rise of temperature occurs is the expansion or increase in volume of the material. Simultaneously therewith the strength and certain other properties may undergo a modification, at first apparent only through critical examination, but eventually as higher temperatures are reached the effects become menacing and finally destructive. Chemical changes occur in some of the materials of construction as well as physical.

Not only is a high temperature menacing, but the rate of change is also detrimental to some classes of materials. Not so, perhaps, if the temperature of the entire mass changed rapidly, but with low conductivity and a friable nature injury may result from internal strains. Furthermore, the proper distribution of stresses in a structure may be so disturbed by reason of parts thereof being heated that cases of overloading

may occur, even to the limit of failure. In any change toward high temperatures there is, in fact, a tendency in the direction of ultimate injury, although a moderate change is of no particular account. But what constitutes a moderate change is nevertheless different in different classes of structures. Changes in temperature unnoticed in a building must be provided for in a bridge, therefore an unqualified statement on the subject is difficult to make.

A property of materials similar to that of expansion or contraction by changes in temperature is that of extension or compression by reason of changes in load. This rate of change, or, in other words, the modulus of elasticity, presents a wider range in values in different structural materials than the co-efficients of expansion by heat. So far as known, however, these two values bear no relation in common to each other.

As temperatures increase the metal portions might at times be the first to undergo a change in strength and rigidity, assuming those portions were accessible to the flames. But again the rate of change may be the controlling factor, and it becomes necessary to assume that slow heating occurred, a condition not often realized in a conflagration.

Before the ultimate strength of any part of a structure is reached there may have been so decided a modification in the distribution of the loads by reason of the successive changes which have prevailed, that the final appearance is not necessarily indexical of the primary cause of failure. So many reservations are necessary in any general statement that further remarks of this kind will be suspended and a number of diagrams presented on which are shown features of the physical properties of structural materials which have a bearing upon the subject.

Relative Rigidity of Materials of Construction

Diagram No. 1 shows the relative rigidity of structural materials. Steel has the highest modulus of elasticity of any of the materials used, and its relative rigidity is indicated in the open space above the full line at the left-hand side of the diagram. The several open lines above each of the solid ones represent in turn the relative extensibility or compressibility of the materials named on the diagram, based upon their respective moduli of elasticity. Three values pertain to

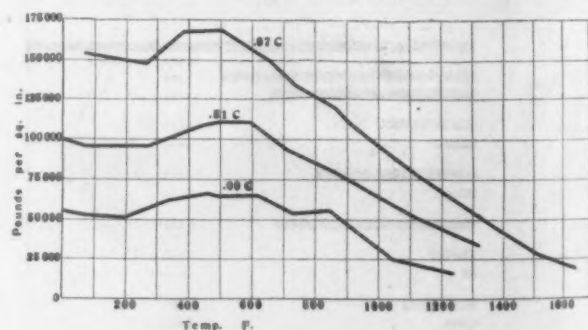


Fig. 2.—Tensile Strength of Steel at Different Temperatures.

the materials when stressed by comparatively low loads, or within their elastic limits. Two values are given for cast iron, and two for each of several other kinds of material, while for brick three are shown, representing hard, light hard and salmon brick. In the case of long leaf pine the difference usually found between the tops and the butts of the trees is indicated by the two open lines of the diagram.

The significance of the lines on the diagram is this: If each of the materials represented thereon were loaded by compression with the same load per square inch of sectional area, then their shortening in height would take place relatively as here indicated for columns originally all of the same height. That is, a load applied to a steel column of such a height that its total

compression would amount to 1 in., and such a column of steel need only be 80 to 90 ft. high, then the same load applied to a cast iron column would shorten it from 1 5/8 to 2 in. To carry this comparison to the other materials a lower stress per square inch would need to be considered than contemplated in the case of steel and cast iron.

But on a suitable basis of comparison the load which would shorten a steel column a given amount would shorten a monolithic column of hard brick three times as much, and if made of salmon brick 60 times as much. Neat Portland cement is seven and one-half times as compressible as steel. Sandstone from 7 1/2 to 25 times as compressible, and so on for the other materials as indicated on the diagram.

It must not be forgotten, however, that the results on the diagram refer to the compression of the materials within their elastic limits. It is quite a different matter when considering overloads which cause permanent sets.

Tensile Strength of Steel at Different Temperatures

Diagram No. 2 shows the curves of tensile strength of three grades of steel when at different temperatures. Over the range of atmospheric temperatures steels are strongest when cold at zero F. At lower artificial temperatures the strength is greater still. At about the temperature of boiling water the strength reaches a first minimum, after which it increases to the crest at a zone in the vicinity of 400 to 600 degrees F., after which there is a steady drop until the metal becomes plastic, at a bright red or yellow heat.

It appears from the best evidence available that the curves of elastic limits would not follow those of tensile strength, but show a gradual drop throughout as the temperature rises.

Expansion of Confined Materials

Diagram No. 3 shows the predicted expansive force which would be developed by confined materials when the temperature is raised. The figures on the diagram are based on the moduli of elasticity and the co-efficients of expansion of the materials. A range in temperature of 160 degrees F. was used, since this change in temperature will cause an expansion in a steel bar equal in amount to the extension which it will display under a stress of 30,000 lb. per square inch—that is, equal to the extension of a piece of mild steel at its

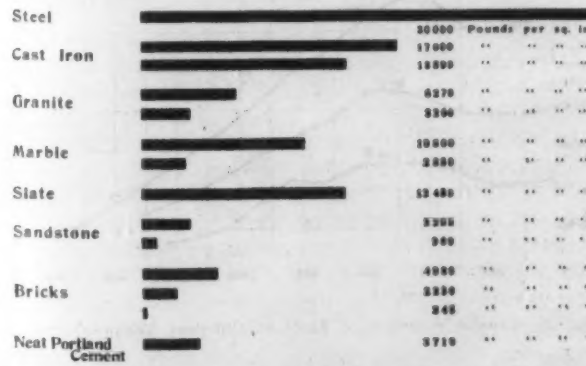


Fig. 3.—Relative Expansive Force of Confined Structural Materials When Temperature Is Raised 160 Degrees F.—Approximate, Predicted Values.

elastic limit. Steel pre-eminently leads in many of the physical constants, and as here compared has a value quite beyond the other materials of construction.

The harder varieties of stone appear capable of developing an expansive force considerably above the softer stones of the same kind, which is due chiefly to the differences in their rates of compressibility under stresses.

Three predicted values are given for brick, to represent the behavior of hard, light hard and salmon brick. The very low value for salmon brick is signifi-

cant. No results are presented on firebrick, but their properties resemble the under burnt building brick in this that firebrick are quite compressible. They successfully resist the effects of heat, in part because of the readiness with which they are compressed. Conversely, firebrick would not be expected to display a high expansive force when confined.

Lime mortar is very compressible, and makes a good cushion in a wall for the stronger brick to act upon when heated. These expansive forces must be guarded against or may be neglected according to the kind of material or its position in the structure. It will be noted that the range in temperature here considered, only 160 degrees F., is an exceedingly limited one; if, however, these predicted values are approximately

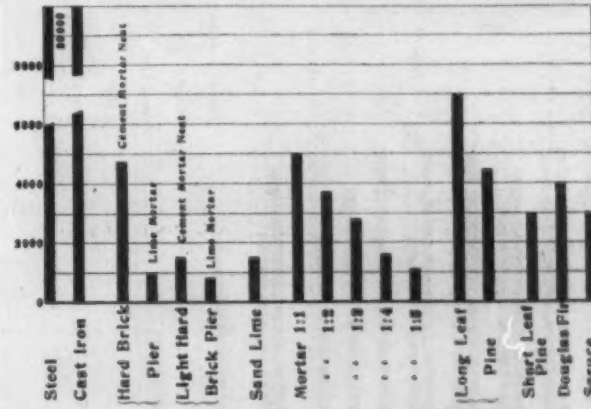


Fig. 4.—Compressive Strength of Columns of Different Structural Materials.—Steel and Cast Iron at 30,000 Lb.

reached the gravity of thermal changes in causing disrupting forces may be realized.

Compressive Strength of Columns

Diagram No. 4 shows the compressive strength of a group of columns of different kinds of structural materials. The compressive strength of steel columns is given at 30,000 lb. per square inch, an ordinary strength for structural steel. It may vary from this according to the grade of steel used, lower or higher according to the elastic limit of the metal, and modified by the workmanship. The compressive strength of cast iron columns has been found in the vicinity of 30,000 lb. per square inch also. This metal occasionally gives higher results, and at times lower. The uncertainty of having an unsound casting is a source of trouble and detracts from the reliability of cast iron.

The strength of individual brick greatly exceeds that of brick when laid in piers. This is due largely to the grade of mortar employed. Hard burnt brick frequently range in strength from 15,000 to 20,000 lb. per square inch when tested singly and an exceptional shale brick was found to possess the phenomenal strength of 38,000 lb. per square inch.

In piers, however, a compressive strength of 3000 lb. is a very good one, although when a hard brick is laid in neat cement a resistance between 4000 and 5000 lb. may be displayed. The same grade of brick in lime mortar will develop only about 1500 lb. per square inch ultimate strength. Light hard brick show less difference in strength whether laid in neat cement or in lime mortar. They develop lower strength than the harder brick, and being nearer the strength of the lime mortar the cushioning of the mortar is more favorable relatively. Provided the stronger brick could be laid in mortar having nearer the characteristics of the brick than a much higher strength might reasonably be expected. Sand lime brick range in strength from 1500 to 3000 or 4000 lb.

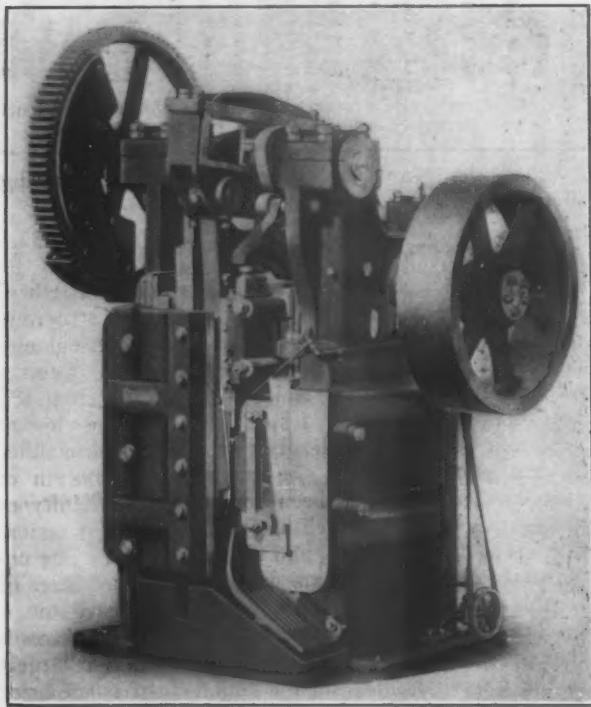
The strength of mortar composed of Portland cement depends upon the richness of the mixture. The diagram illustrates the range which may be expected in mortars from a one and one mixture to a mixture

containing 1 part Portland cement to 5 parts of sand. The rigidity of these mortars is approximately in proportion to their strengths. The strengths of concretes follow about the same as that of the cement mortars. The addition of the stone has been found not to modify the ultimate strength over wide ranges. Some examples have shown a slight loss in strength of the concrete over that of the mortar used without the stone, and illustrations of the opposite kind may also be found.

Occasional sticks of long leaf pine are found which develop the maximum strength plotted on the diagram, but a common strength is in the vicinity of 4000 lb. per square inch, while 3000 lb. is an ordinary value for short leaf pine. Douglas fir has generally a compressive strength of about 4000 lb. per square inch. These values are such as may be found, but the wide range in ultimate strength which is displayed by structural materials makes it necessary to consider specifically the properties of those materials which are actually to be used when judging of the strength of any particular structure.

New National Vertical Roll Thread Machine

Among the machines demonstrated at the recent exposition of bolt, nut and forging machinery at the



The Vertical Roll Thread Machine Built by the National Machinery Company, Tiffin, Ohio.

plant of the National Machinery Company, Tiffin, Ohio, August 19 to 23, 1910, referred to in *The Iron Age*, August 4 and September 1, was a vertical roll thread machine. The machine is built in three sizes, with maximum capacities for rolling threads 1 in. in diameter by 3 in. long, $\frac{1}{2}$ x 4 in. and 2 x 4 in., although intermediate diameters to 6-in. lengths can also be rolled. The special feature of this machine is that the blanks are fed into the dies horizontally, so that work of any length can be handled.

In this machine long rods can be threaded as well as bolts. The present day practice in cutting threads on the ends of rods is either to upset the ends of the rod or else use one having a larger diameter in order to secure the necessary strength in the threaded portion. Thread rolling possesses the advantages of great savings in labor and material since stock smaller in diameter can be used without impairing the strength of the thread, as recent tests made by the Franklin

Institute demonstrated that the strength of a thread formed by rolling is equal to that of the shank of the bolt or rod itself.

In addition to enabling all lengths of work to be handled, the feature of feeding the stock to the dies horizontally gives a frame that is very rigid and occupies a minimum amount of floor space, while the ability to flood the dies which have their grooves in a vertical plane with lubricant insures thorough cleansing of the thread and increases the life of the die. A Scotch yoke gives a slow downward stroke and a quick return to the reciprocating die slide, which is backed by a train of hardened steel rollers actuated by a series of racks and pinions. This type of bearing reduces the friction to a minimum, as well as the wear of the moving parts and the power required to operate the slide. The die box is stationary, and has wedge adjustments that are easily accessible from the front of the machine and permit very minute adjustments to be secured.

The friction slip flywheel which was a feature of the improved forging machine that was illustrated in *The Iron Age*, November 3, 1910, is employed on this machine also. The flywheel acts as a relief to the machine, and if the dies loosen through neglect on the part of the operator or any other accident should occur to prevent a full stroke from being made, it slips between the friction disks. In this way the momentum of the flywheel is dissipated, and the strains and damage attendant on a rigid flywheel eliminated.

In operation a single blank lies upon a rest or feed bar, and the starter which is actuated by a cam on the main shaft inserts the blank into the gap between the dies at the proper time and presses it against a gauge. The feed bar then automatically backs out of the dies and returns to its original position where it picks up another blank. The movement of this bar is always parallel to the face of the dies, and the starter aids to insure the blank being correctly inserted. Both the rest and the starter are capable of adjustment for handling various diameters of blank within the capacity of the machine.

The lubricating system is of the force feed type, and keeps the dies continually flooded with lubricant. This keeps the dies free from scale and dirt, which increases the life of the dies and insures a better finished output. After cleansing the dies the lubricant returns to the reservoir to be used over and over again.

The Cote Steel Tie.—George M. Cote, 714-15 Curry Building, Pittsburgh, Pa., has perfected a new form of steel tie, on which he has been working for over three years. The tie is pressed from a cold plate by hydraulic machinery, making the process of manufacture ideally cheap. Adjustable fasteners clamp the rail in place. The design of the tie has been shown to a number of leading railroad representatives, who have expressed themselves in a manner very satisfactory to the inventor. He is arranging to form a company to erect a plant for the manufacture of the tie and its appliances. Mr. Cote has been in the lumber business 27 years, furnishing railroad companies with ties, and not only understands railroad requirements in this respect, but also fully appreciates the scarcity of lumber and the desirability of furnishing railroads with a satisfactory substitute for the wooden tie.

The Carnegie Steel Company, Pittsburgh, has recently shipped the material for a new steel frame saw mill to be built by W. T. Carter & Bro. at Camden, Tex., which will be the first of this new type of construction in the Southwest. The incident is notable for the reason that it illustrates the opening up of a large new field for structural steel and the apparatus used for its erection in one of the country's most important industries.

The Schuchardt & Schütte Thread Miller

An Automatic Machine for Rapidly Producing Large Screws and Spur Gears

The practice of cutting screw threads on the engine lathe while it is the commonly accepted standard is said to be open to the objection that the work turned out is not absolutely accurate. The advancements and improvements made in the construction of modern machine tools by which it is possible to mill the threads so that they are correct within the smallest allowable amount of error has led Schuchardt & Schütte, West Street Building, New York City, to design a thread milling machine. Fig. 1 is a front view of the machine showing a thread being cut and Fig. 2 shows the drive and the change gear box. In both engravings the same reference letters have been used to indicate the same part with a view to making their location easier.

The special advantages claimed for these machines are that they will cut a thread within the closest limit of error at a fraction of the cost of doing this work in an engine lathe and a capacity of from two to eight times that of a lathe. This latter feature is most noticeable when cutting multiple threads with high leads. Although designed for milling threads, the machine can also be used for cutting spiral gears with extreme angle of teeth up to a maximum diameter of 10 in. For the regular work of thread milling, the range of work handled includes both right and left hand threads with angles up to 45 deg. and leads up to 20 in.

The machine is entirely automatic in operation. The drive is from a countershaft to the cone pulley shown in Fig. 2. From this point the rotation of the cutter H and the blank G are accomplished by differ-

shown in the engravings is used to set the cutter at the proper angle in the vertical plane for the various angles of threads.

The rotation of the blank and the table feed are accomplished through the chain running over the two sprockets at the rear of the machine, Fig. 2, and the gear box N. The upper of these sprockets is driven through spur gearing from the cone pulley shaft and the lower one drives the gear box. This is of the

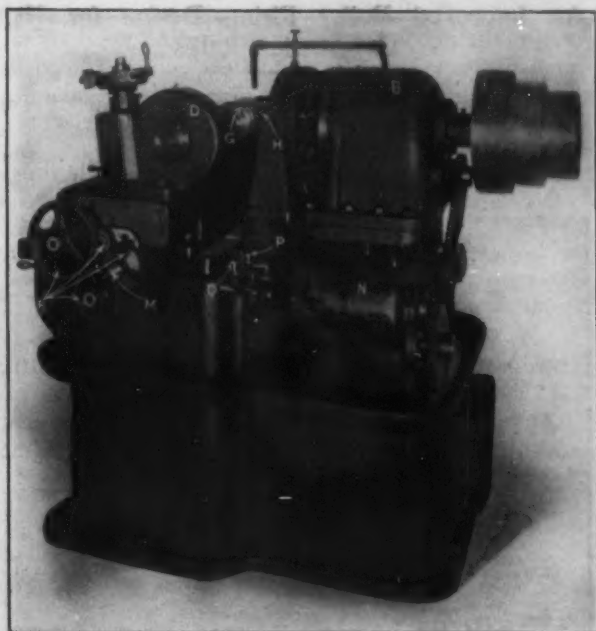


Fig. 2.—End View Showing the Drive and the Change Gear Box.

three-shaft type with sliding gears which have their movements regulated by the two cranks O and P. Twenty feed changes in all are available through the movement of these two cranks in combination. From this gear box, motion is transmitted through bevel and worm gears to the table lead screw. The spindle drives the indexing head C through a set of worm gears in the case D, having a ratio of 40 to 1. The change gears E provide for the various threads to be milled. The movement of the table toward and away from the cutter is controlled by the crank I and the longitudinal movement is regulated by the position of the dog J which strikes against the lever K and trips the feed. In conjunction with the change gears the number of threads milled per inch is regulated by the number of turns given to the indexing head, while for special threads recourse is had to an independent adjustment, L, which meshes with the worm on the spindle. The quick return crank fitted to the square nut M on the end of the lead screw enables the table to be rapidly shifted by hand.

Two sizes of machine are built, the smaller being the one illustrated, and the accompanying table gives the principal dimensions and specifications of both:

	No. 1.	No. 2.
Maximum diameter of blank, inches.....	9	12
Maximum length of thread, inches.....	16	20
Minimum lead, inches.....	$\frac{1}{4}$	$\frac{3}{4}$
Maximum lead, inches.....	20	20
Divisions up to, inches.....	$1\frac{15}{16}$	2 $\frac{1}{2}$
Maximum angle of thread, degrees.....	45	45
Diameter of hole through spindle, inches	$1\frac{1}{16}$	1 $\frac{1}{4}$
Minimum distance between cutter and work arbor, inches.....	2 $\frac{1}{4}$	2 $\frac{1}{2}$
Diameter of hole in cutters, inches.....	$1\frac{1}{16}$	1 $\frac{1}{8}$
Minimum feed per revolution of cutter, inches.....	0.01299	0.01299
Maximum feed per revolution of cutter, inches.....	0.05236	0.05236
Diameter of countershaft pulleys, inches.	12 and 8	18 and 10
Belt width, inches.....	3	3 $\frac{1}{2}$
Net weight, pounds.....	3,000	4,700

The equipment regularly furnished with the machine includes a countershaft, one work arbor 1 $\frac{1}{4}$ in.

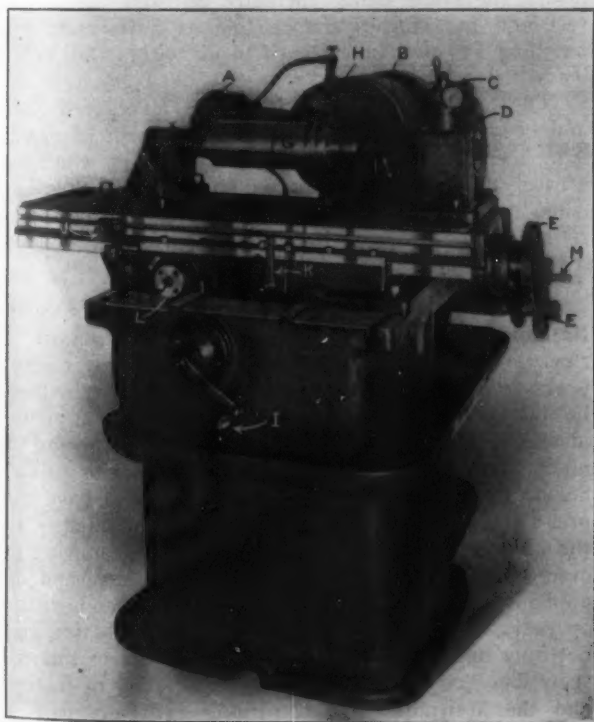


Fig. 1.—Front View of a Large Automatic Thread Miller Built by Schuchardt & Schütte, New York City.

ent means. The cone pulley shaft drives the cutter spindle through two sets of bevel gears, one in the front part of the case B and the other at the point A, Fig. 1. This spindle is set at a fixed angle of 12 $\frac{1}{2}$ deg. to the axis of the work and it is stated that this angularity permits a greater driving gear ratio, brings the work closer to the cutters and enables smaller cutters to be employed. A vernier which is not clearly

in diameter, the pump and fittings for an automatic water supply, a complete set of wrenches and the other accessories necessary to operate the miller. A special head spindle having a hole with a maximum diameter of $3\frac{1}{4}$ in. to accommodate shafts passing through can be furnished as an extra.

The Taylor Gravity Underfeed Stoker

An Improved Boiler Firing Device for High Combustion Rates

The American Ship Windlass Company, Providence, R. I., has developed the Taylor stoker to dispose of ashes and other refuse rapidly. This makes it possible to burn the large quantities of coal which

of these lower plungers had to be adjusted for each separate retort. In the new type, while the travel of the upper row of rams that assist gravity by pushing the coal into the fire is constant, the length of stroke of the lower set can be simultaneously increased or diminished at will. When the dumping plates B have been dropped it is frequently desirable to push the refuse out more rapidly than usual, and at other times when it becomes necessary to get rid of the refuse that has collected in the lower part of the furnace, the travel of the plungers is increased temporarily and subsequently restored to its original length.

A type of pantograph lever connection having a cam and balance weight on the upper member, as shown in Fig. 2, controls this variation in the travel of the lower plungers. The cams are pivoted to the connecting rods and are connected by chains, lever arms

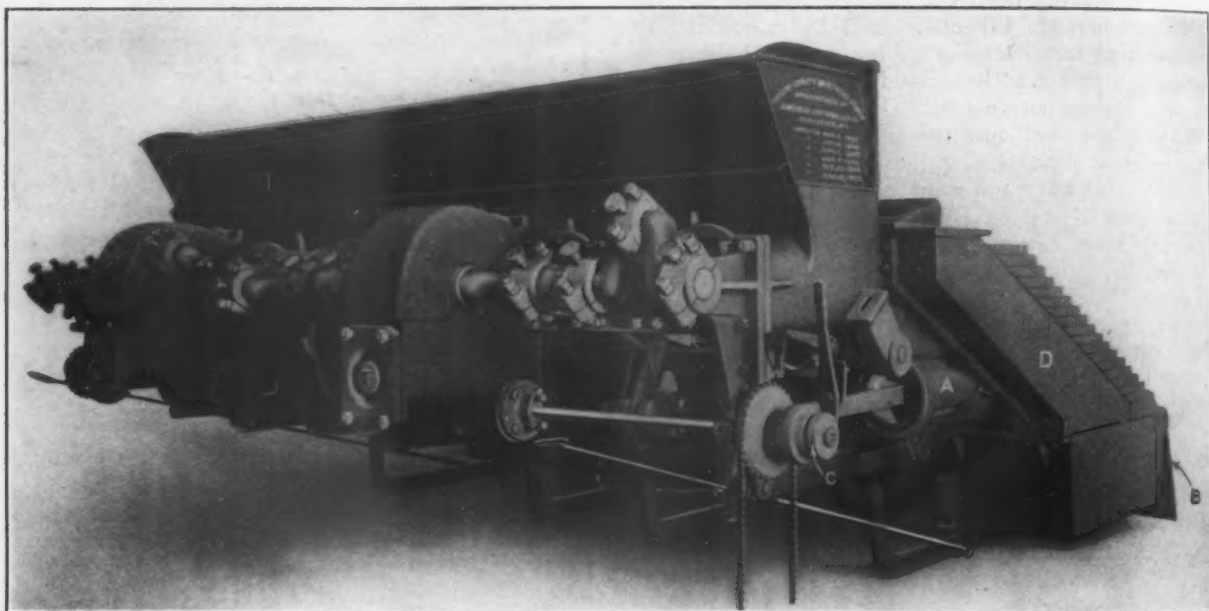


Fig. 1.—Front View of the Taylor Stoker Made by the American Ship Windlass Company, Providence, R. I.

are required when boilers are operated at double their rated capacities, and by maintaining intense fires and rapid circulation to concentrate the load on a few units with the resultant minimizing of loss, a condition which undoubtedly conforms to what may reasonably be expected to be the boiler practice of the future. The disposal of the great amount of ashes which results from high combustion rates is generally difficult, but has been made somewhat simple in the Taylor stoker by feeding the coal beneath the surface of the burning fuel. This feeding is done at an angle to the surface of the fire with the result that gravity carries the consumed coal to the dumping plates at the rear of the stoker and also aids in distributing the fresh fuel, these features giving the stoker the name gravity underfeed.

The fundamental features of the design of this stoker have remained unchanged since its inception, because the importance of removing the combustion wastes rapidly was recognized when the first stoker was placed on the market. It is claimed for this stoker that it will burn more coal than any other, because of the great refuse handling capacity of the device. Fig. 1 is a front view of the stoker, with the principal parts indicated by reference letters, and Fig. 2 is a longitudinal section through the fire, showing the mechanism by which the fuel feeding and removal of the ashes is accomplished. It is in the construction and operation of this mechanism that the principal changes made necessary by the demand for stokers of increased capacity have been made.

As the stokers were originally built, each of the series of lower rams, A, was directly connected to the bell crank operating the upper plunger, and the stroke

and a shaft to the operating handle at the center of the stoker. When the stroke is to be altered, the adjusting lever is dropped. This releases the cams and allows them to assume a horizontal position, thus lengthening the stroke of the plunger. If the vertical connection of the bell crank lever is in a position that prevents the cam from dropping, the latter remains at rest until the connection has moved backward. Then

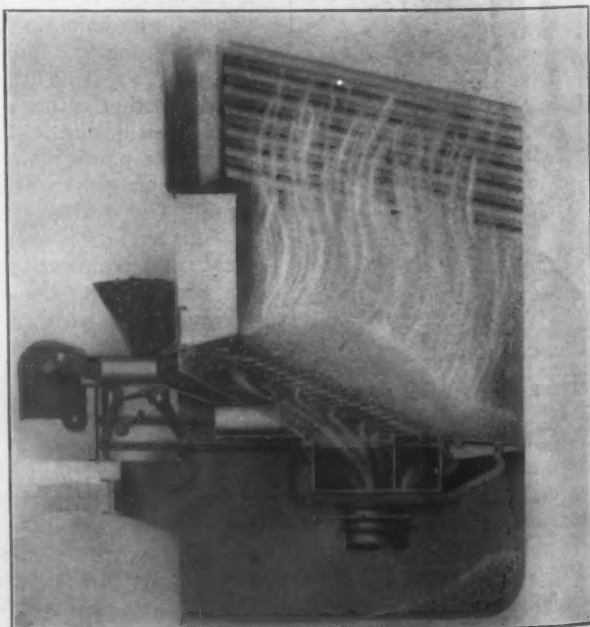


Fig. 2.—Longitudinal Section of the Stoker Through the Fire.

the counterweight falls, and the cam is carried into position.

Two other improvements are the relocation of the speed shaft sprocket and the alteration of the dumping plates. The speed shaft sprocket is now placed at the right end of the stoker together with the clutch C, Fig. 1, and the face plates which hold the shearing pin on the outside. This change is said to facilitate replacing shearing pins when necessary, and the throwing of the stoker on or off the line, while at the same time the connection to the fan shaft is improved. The dumping plates in the earlier types were cast in one piece, but now they are made in independently renewable sections which facilitate the making of repairs and lessen their cost.

Other minor improvements which tend toward simplicity, more certain operation and a reduction in the expense of making repairs are the use of lock nuts in all places where the jar might cause fastenings of the ordinary type to work loose, an increase in the size of the gears in the gear boxes and the shafts and bearings and the employment of body bound bolts to connect the crank shaft brackets to the ram boxes. The cast iron ram boxes and the tuyere boxes D are now carefully doweled together to insure a better connection.

A New Goulds Pumping Jack

A new geared power attachment for operating any windmill pump standard by belt drive from a gas or gasoline engine, electric motor, water wheel, &c., was recently placed on the market by the Goulds Mfg. Company, Seneca Falls, N. Y.



A New Pumping Jack Made by the Goulds Mfg. Company, Seneca Falls, N. Y.

This pumping jack is so arranged that it can be attached to any pump by clamping it to the standard near the base, disconnecting the pump lever and bolting the pitman on the windmill rod. With this arrangement the pump can be operated by the windmill, by hand, or by the engine by changing one bolt and adjusting either the pitman or the lever on the pump rod. Three ranges of stroke are available by changing the wrist pin from one to another of the driving wheel spokes.

The position of the gears and plunger rod is such that the pitman moves vertically on the up-stroke, so that there is no considerable side thrust on the plunger rod. The pinion is protected

by a guard. The pitman is made of wood, and the shaft is 1¼-in. polished steel. The tight and loose pulleys are 12 in. in diameter with 2½-in. face.

The Production of Plates and Sheets in 1909

The production of plates and sheets in the United States in 1909, as shown by statistics just published by the American Iron and Steel Association, was 4,234,346 gross tons, or about 12,000 tons short of the record production, that of 1907. The following table gives the output by States since 1907, in gross tons:

States—Gross tons.	1907.	1908.	1909.
New England, New York and New Jersey.....	126,403	58,567	119,642
Pennsylvania.....	2,651,166	1,531,006	2,384,185
Delaware, Maryland and Virginia.....	29,420	25,000	29,038
West Virginia.....	153,509	159,714	211,012
Kentucky and Alabama.....	54,631	45,473	70,639
Ohio.....	851,987	603,213	938,195
Indiana, Illinois, Wisconsin, Missouri, Wyoming and California.....	382,626	226,000	481,046
Totals.....	4,248,832	2,649,603	4,234,346

In 1909 there were 141 works in 17 States which rolled plates or sheets, against 117 in 15 States in 1908 and 134 in 17 States in 1907.

In the following tables the production of plates is separated from that of sheets, the product of No. 12 gauge and thicker being classified as plates and that of No. 13 gauge and thinner as sheets. Black plates, or sheets, for tinning are included, but nail plate and skelp are excluded. The figures represent gross tons:

Plates.—No. 12 and Thicker.

	Iron.	Steel.	Total.
1905.....	10,022	2,031,184	2,041,206
1906.....	23,233	2,508,210	2,531,552
1907.....	30,277	2,629,783	2,660,060
1908.....	31,679	1,239,342	1,271,021
1909.....	32,332	2,346,766	2,379,098

Sheets.—No. 13 and Thinner.

	Iron.	Steel.	Total.
1905.....	62,134	1,428,890	1,491,024
1906.....	51,040	1,599,564	1,650,604
1907.....	43,761	1,545,011	1,588,772
1908.....	22,854	1,356,318	1,378,672
1909.....	43,870	1,811,378	1,855,248

It will be seen that the production of plates last year fell off 280,000 tons from the record of 2,660,000 tons in 1907, while that of sheets was 268,000 tons more than in 1907, making a new record. The States which rolled iron or steel plates in 1909 in the order of their prominence were Pennsylvania, Ohio, Illinois, New York, Wisconsin, Indiana, Alabama, West Virginia, Massachusetts, Wyoming, New Jersey, Delaware and Kentucky. The States which rolled iron or steel sheets in 1909 in the order of their prominence were Pennsylvania, Ohio, West Virginia, Indiana, Illinois, Kentucky, New York, Delaware, Maryland, Missouri, Massachusetts, Connecticut and California. Of the total production of iron and steel plates in 1909 Pennsylvania rolled 1,631,271 tons, or over 68.5 per cent., against 980,025 tons, or over 77.1 per cent., in 1908, and of the total production of iron and steel sheets in 1909 Pennsylvania rolled 752,914 tons, or 40.5 per cent., against 551,041 tons, or almost 40 per cent., in 1908. Ohio rolled 353,177 tons, or over 14.8 per cent., of the total production of plates in 1909, and 585,008 tons, or over 31.5 per cent., of the total production of sheets.

Operation of trains and public use of the whole of the new Pennsylvania station, New York, began at two minutes past midnight of Saturday, November 26. The full schedule of trains at present consists of 61 trains westbound and 55 trains eastbound every 24 hours. These do not include the 88 eastbound and 85 westbound trains of the Long Island Railroad. Work on the tunnels was begun June 10, 1903, and the station was begun May 1, 1904, so that more than seven years have been consumed in construction. Preliminary surveys and soundings were made for two years previously.

Cutler-Hammer Alternating-Current Motor Starters

In line with the increasing use of alternating-current motors, especially in industrial plants, the Cutler-Hammer Mfg. Company, Milwaukee, Wis., has duplicated much of its direct-current controlling apparatus in alternating-current type. For single-phase motors, standard starting rheostats similar in appearance and operation to the familiar direct-current motor starting box are now on the market in sizes up to 35 hp.

For polyphase motors the three types of starters illustrated represent the latest developments. The face plate type, Fig. 1, is adapted for use with motors of moderate capacity, the standard sizes ranging from 5 to 50 hp. It is inexpensive, compact and easily operated, and can be mounted on the wall or other convenient location. The resistance is mounted on the rear and no extra wiring is needed, as where the resistance is mounted separately. The only wiring required is to connect the slip rings of the motor to the three terminals on the face plate. The contact segments are of hard drawn copper and can be easily replaced or interchanged without interfering with any interior connection.

The brushes consist of a pair of contacts at each end of the lever. The leading contact of each pair is carbon and the other copper. This is claimed to result in long wear, as the carbon takes the arc, while the copper, which has a low contact resistance, carries the current.

A latch is provided for holding the lever in the running position, but this can be replaced if desired by a no-voltage release. If the current fails the primary circuit is automatically opened and the rotor resistance re-inserted. An overload attachment can

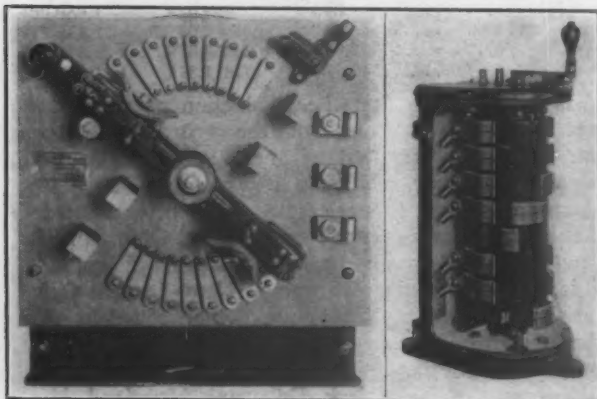


Fig. 1.—Face Plate Starter. Fig. 2.—Drum Starter.
Two New Polyphase Motor Starters Made by the Cutler-Hammer Mfg. Company, Milwaukee, Wis.

also be provided to open the primary circuit and cut in the resistance in the secondary when the motor is overloaded.

For larger motors and in locations where dust, lint, &c., are present the drum type of starter is preferred. This, shown in Fig. 2, is made in standard sizes, ranging from 10 to 200 hp. The drums are tightly fitted and constructed to withstand severe service. The contacts and brushes are hard drawn copper and can be renewed at slight expense. The cylinder on which the contacts are mounted is built to remain perfectly true under all conditions. The terminals are arranged on the side and are readily accessible. This type of controller can be handled by any workman without danger of accidental contact with current-carrying parts. The cutting out of the resistance and the acceleration can be easily controlled.

In starting very large motors and those operating under especially heavy starting conditions the heavy currents resulting cannot be handled in the best man-

ner by apparatus having sliding contacts. The arcing and wearing of the contacts would be excessive. For such use a device is necessary which will stand the severe service with minimum chance for wear. The multiple switch starter, Fig. 3, has the qualities of design and construction which make it especially adapted for starting large or heavily loaded two or three phase slip ring motors. The standard sizes made range from 50 to 600 hp.

Many features of the Cutler-Hammer direct-current multiple switch starter have been embodied in this

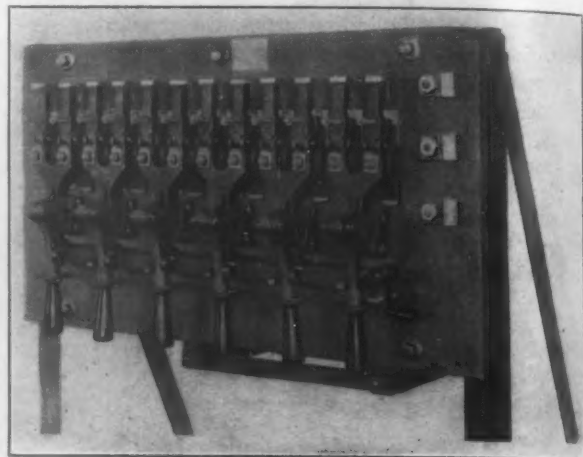


Fig. 3.—The Multiple Switch Type Starter for Polyphase Slip Ring Induction Motors.

alternating-current device. It is claimed no sparking at the switch can occur in starting, whether under load or not. The switches are not like ordinary knife switches, but are of circuit-breaker construction, making full contact instantly. Besides doing away with sliding contacts, the multiple switch starter prevents the hasty cutting out of resistance, as each switch must be closed separately, beginning at the left. The time taken insures a smooth acceleration of the motor and prevents injury due to large current inrush.

The contacts of the switches are so connected that the resistance is cut out of the phases of the secondary at the same time. The currents in the legs are therefore approximately equal and an electrical balance is maintained. The motor is started under the best conditions, each phase producing its share of the torque. This type of starter is claimed to be the most serviceable for use with large motors such as are used to a great extent in steel mills and other plants. Automatic no-voltage and overload release can be provided for opening the primary circuit and re-inserting the secondary resistance in case of failure of current or overloading of motor.

Railroad Equipment Orders.—Among recent car orders are 1000 50-ton steel hopper cars for the Carolina, Clinchfield & Ohio. The Boston Elevated is having 50 cars built by the Laconia Car Company. The New York Central is inquiring for 1000 box cars and 110 refrigerator cars. The New York Despatch Refrigerator Line has ordered 300 30-ton refrigerator cars from the Whipple Car Company, and the Pennsylvania Lines West 150 cars from the Pressed Steel Car Company. The Baldwin Locomotive Works has an order for 10 consolidation locomotives for the Seaboard Air Line. The New York Central has brought its locomotive orders for 1910 up to 323, of which 203 were for replacements. The last order was for 120 locomotives, and was placed with the American Locomotive Company. Of these 60 will be for the New York Central Main Line, and the remainder for the Michigan Central and the Big Four. The Cincinnati, New Orleans & Texas Pacific is in the market for five passenger locomotives and 10 110-ton consolidation locomotives.

New Triumph Alternating Current Generators

Special features of a new line of alternating current generators built by the Triumph Electric Company, Cincinnati, Ohio, are the thorough ventilation of all parts, and the ability to operate in parallel with machines of other make. These machines are of the stationary armature and revolving field type and are

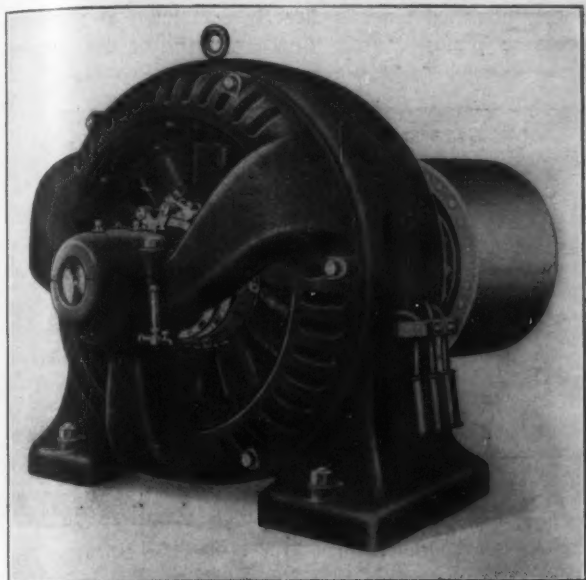


Fig. 1.—An Example of the New Revolving Field Type Alternators Built by the Triumph Electric Company, Cincinnati, Ohio.

built for either direct connection, for coupling to an engine, or may be belt driven as desired. The sizes range from 50 kw. upward and may be obtained for single, two or three phase circuits and for 240, 480, 600, 1200 or 2400 volts. The design and construction are claimed to make them very strong and serviceable.

The usual standard ratings of 35 degrees and 40 degrees C. temperature rise have been adopted, and any machine can be furnished for either of these ratings according to the duty it has to perform. Generally speaking, a 40 degree C. temperature rise will be ad-

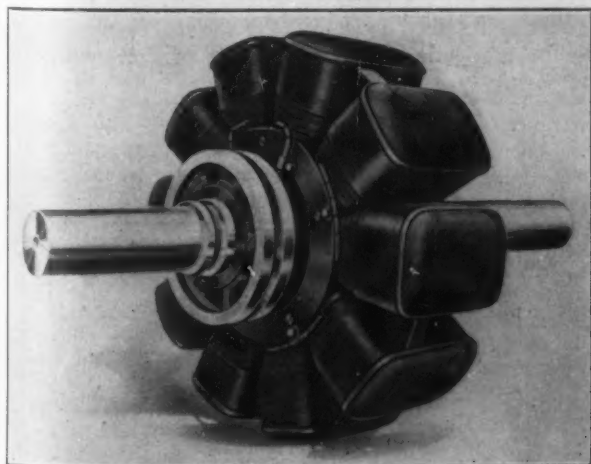


Fig. 2.—The Revolving Field of One of the New Triumph Alternators.

vocated for machines which have to carry a non-inductive load, while a machine which has to carry an inductive load, such as arc lamps or induction motors, will be rated on the 35 degree C. basis. The regulation of these new alternators is declared to be in accordance with the best engineering practice and to vary from 6 per cent. on a machine with a 35 degree C. rise to 8 per cent. with a machine rated at 40 degrees C. temperature rise.

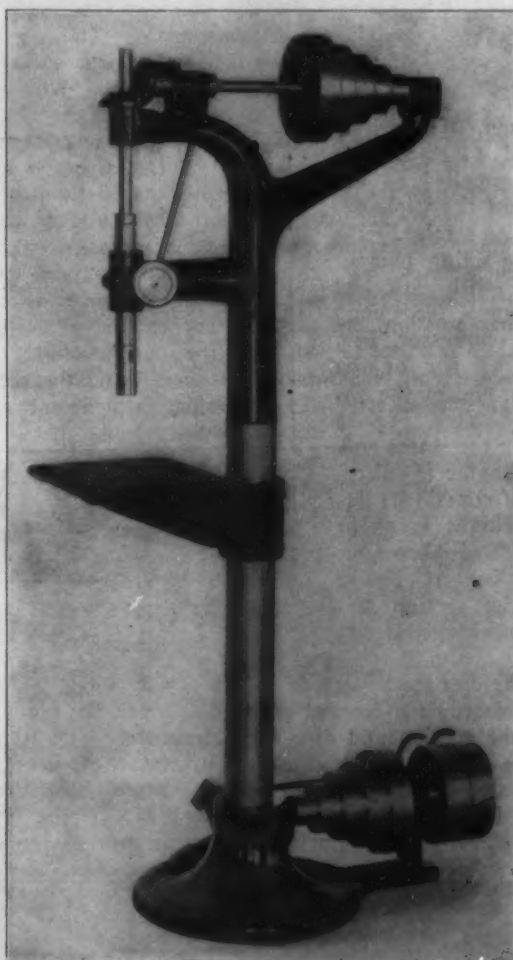
The use of a relatively large amount of copper in

both the rotor and stator windings has reduced the copper loss to a minimum. In addition due to the design of the stator the core losses are comparatively low, so that these machines have high efficiencies. Fig. 1 shows one of these alternators and gives a good idea of the compact and pleasing design, and Fig. 2 shows the revolving field removed.

A New Sibley Sensitive Drill Press

The 16-in. sensitive drill recently brought out by the Sibley Machine Tool Company, South Bend, Ind., in a general way follows the standard practice. While its construction is of the same type as the standard light drill press, it nevertheless possesses the distinctive feature of being self-oiling throughout.

The lubricating system consists of oil chambers filled with lambs' wool, saturated with oil, which are located beneath each of the four horizontal bearings. From these chambers the oil is fed through a slot in



A New 16-In. Sensitive Drill Press Built by the Sibley Machine Tool Company, South Bend, Ind.

the bottom of the bearing by capillary action to the shaft. The bearing for the crown gear is oiled in a special way as well as the loose pulley shaft. For the former the lubricant is drawn from a chamber situated just back of the wick, while for the pulley shaft a tube screws into the pulley hub. This tube contains a lubricating candle which is kept against the shaft by the pressure of a light spring.

Five spindle speeds, ranging from 150 to 1700 rev. per min. are available when the countershaft is running at 500 rev. per min. A special feature of the spindle is that it is not counterbalanced but is kept rigidly in any position by a brass friction. Miter gears are used throughout and are said to insure quiet running at high speeds. The base, which is of ample proportions, gives the tool the required stability. The drill press with the regular equipment weighs 300 lb.

Muskegon's New 6,000,000-Gal. Pumping Engine

A Huge Steam Driven Pumping Set Built by the Platt Iron Works Company

The city of Muskegon, Mich., has installed a 6,000,000-gal. high-duty pumping engine, which is supplying water to a direct-pressure municipal distribution system. The provisions of the specifications covering this engine called for an engine having a capacity of 6,000,000 gal. per 24-hour day and a duty of not less than 135,000,000 ft.-lb. per 1000 lb. of steam at a pressure of 125 lb., capable of supplying water at a domestic pressure of 70 lb. and a fire pressure of 125 lb. per square inch. The Platt Iron Works Company, Dayton, Ohio, secured the contract and supplied an engine of the triple-expansion straight flow, single-acting plunger type with attached air pump, feed pump and compressor. Fig. 1 is a view of the steam end of the engine and Fig. 2 shows the water end. The engine is entirely self-contained. Its total height is about 45 ft. and its weight, exclusive of piping for the suction and the discharge, is 225 tons.

The cast-steel valve decks are of the double-bottom type placed in a vertical position between the plunger and the suction and discharge chambers. The water valves are contained in cages, which are secured to the valve deck by bronze bolts. As will be noticed from Fig. 1, the steam end is of the A frame type with bored guides. Corliss type valve gear driven by

eccentrics and rocker arms directly from the main shaft is employed and the speed and water pressure are controlled by two automatic governors, and changes from high to low speed or from the domestic to the fire pressure, or *vice versa*, have been made while the engine is in operation in from 15 to 20 seconds.

The surface condenser is placed in the suction line of the pump. The air pump, which is of the single-acting attached type, is directly connected to the low-pressure plunger head, together with the feed pump and the compressor supplying air to the air chambers.

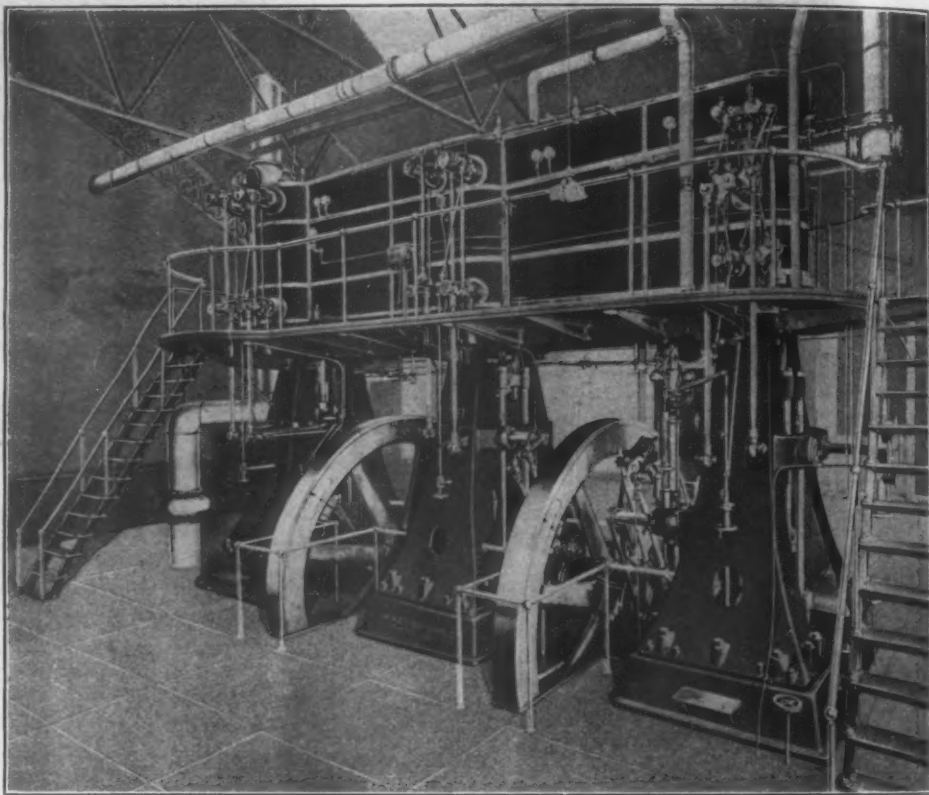


Fig. 1.—The Steam End of the 6,000,000-Gal. Pumping Engine Built by the Platt Iron Works Company, Dayton, Ohio, for the City of Muskegon, Mich.

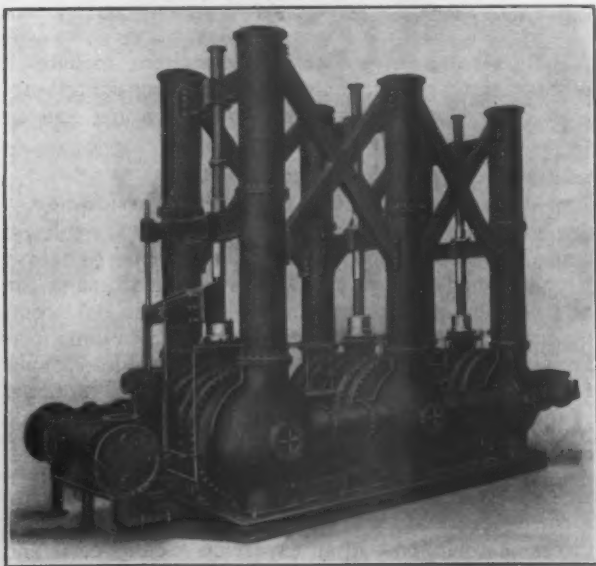


Fig. 2.—Water End of the Muskegon Pumping Engine.

The water of condensation is delivered to a hot-well, where it is freed from oil, the latter being returned to the lubricating system, which is of the continuous automatic type.

In the recent test of the engine made for the city by Henry A. Allen & Co., Chicago, with a steam pressure of 90 lb., the capacity of the engine was 6,589,200 gal. per 24 hours and the duty per 1000 lb. of dry steam was 141,536,000 ft.-lb. The contract requirements called for a pressure of 125 lb. of steam at the throttle, but on account of unsatisfactory boiler equipment and the uncertain condition of the city water mains it was impossible to conduct the test under regular service conditions. The leakage tests of the pump valves and the plungers gave a result of 0.219 per cent., which is so small as to be negligible, and consequently the quantity of water pumped was determined by plunger displacement. The steam passing through the cylinders was determined by weighing and the percentage of moisture ascertained with a throttling calorimeter. All the test instruments were read every ten minutes and indicator cards were taken every hour. The duty per 1000 lb. of dry steam at a pressure of 90 lb. was figured at 141,536,000 ft.-lb., or 6,536,000 ft.-lb. in excess of the contract requirements at a pressure of 35 lb. greater. When this duty was corrected for the difference existing between the actual and the contract steam pressures, the figure was increased to 151,695,000 ft.-lb., and it is claimed that even this will be exceeded in regular service.

The Grand Rapids Plain Milling Machine

While the new plain miller recently brought out by the Grand Rapids Machine Tool Company, Canal and Newberry streets, Grand Rapids, Mich., conforms generally to the standard design of the column milling machines now on the market, it possesses a number of special features of its own. All of these tend toward greater rigidity and strength and easy operation, thus making the machine one that is well adapted for high-

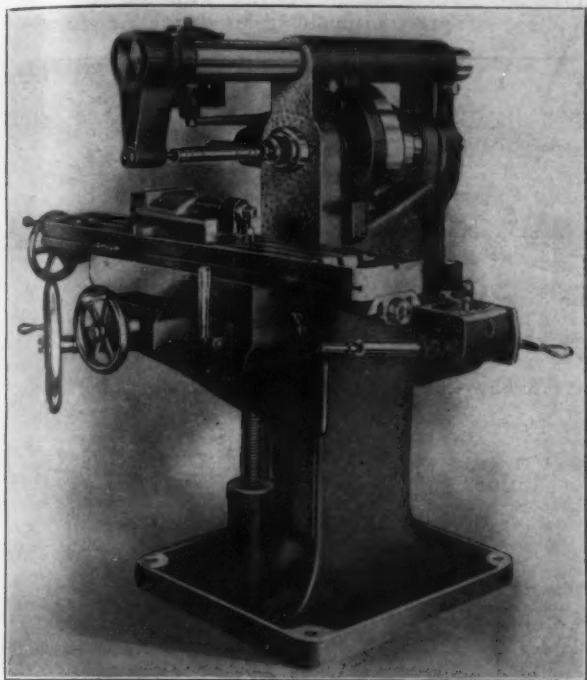


Fig. 1.—General View of a New Plain Miller Built by the Grand Rapids Machine Tool Company, Grand Rapids, Mich.

speed service. Fig. 1 is a general view of the miller, while Figs. 2 and 3 show the two feed changing gear boxes.

The column is cast in one piece, but the base is much wider than usual to resist the weight of the table when at either limit of its motion, and is surrounded by an ample oil retaining rim. The knee is of the customary box type and has an extended top and an extra long bearing on the column. Raising and lowering the table is accomplished by a telescoping screw. The

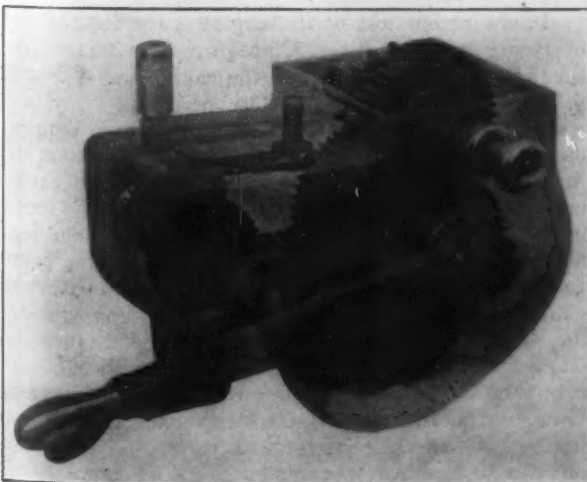


Fig. 2.—The Rear Feed Changing Gear Box.

saddle is very deep and 22 in. long and is fitted with a compensating stationary nut.

The table has a working surface of 32 x 8 in. and three $\frac{5}{8}$ -in. T slots provide plenty of space for clamping the various fixtures used in place. Although the width of the table is 8 in., it is possible to clamp a

10-in. indexing outfit in position and cut work within the full range of the machine. The crucible steel spin-

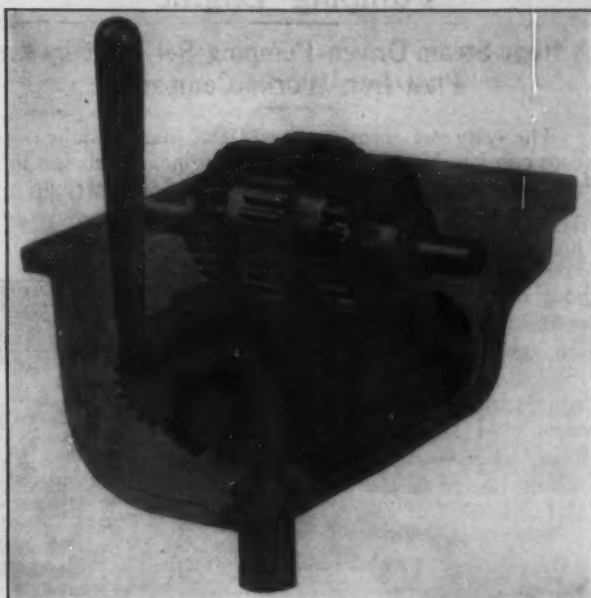


Fig. 3.—The Second Feed Change Gear Box.

dle is bored to conform to the No. 10 Brown & Sharpe standard taper.

The drive is from a countershaft to a three-step cone pulley, with 6, 9 and 12 in. diameters for a 3-in. belt, when equipped with back gears having a ratio of $6\frac{1}{2}$ to 1. When the back gears are not furnished a four-step cone pulley is employed, having 6, 8, 10 and 12 in. diameters. From this shaft a nickel steel chain runs to the gear box for the feed changes at the rear of the machine shown in Fig. 2. The gears in this box as well as those in the second feed changing gear box, Fig. 3, with which it is connected by a universal joint telescoping shaft, are of coarse pitch of the selective sliding type and both in combination render 12 rates of feed available. Throwing the lever of the second gear box to one side engages the feed, which causes the table to move until the feed is disengaged by pulling the lever forward.

Following are the principal dimensions and specifications of the machine:

Length of saddle, inches.....	22
Working surface of table, inches.....	32 x 8
Taper of spindle, B. & S.....	10
Ratio of back gears.....	$6\frac{1}{2}$ to 1
Width of belt, inches.....	3
Number of feed changes.....	12
Table travel, inches.....	24
Saddle travel, inches.....	8
Knee travel, inches.....	18
Net weight, pounds.....	2,020

The regular equipment of the machine includes a countershaft with friction clutches and ring oiling bearings, a complete set of wrenches, a large vise and an oil reservoir of liberal capacity.

The National Implement and Vehicle Association.

Several associations identified with the agricultural implement and vehicle industries have entered into a merger, which was completed November 18 under the title of the National Implement and Vehicle Association. It succeeds to the following organizations: National Association of Agricultural and Vehicle Manufacturers, National Plow Association and National Wagon Manufacturers' Association. E. D. Metcalf of the International Harvester Company, Auburn, N. Y., is president of the new association. The secretary and general manager is E. W. McCullough, Chicago, formerly secretary of the National Wagon Manufacturers' Association and an expert on factory costs and cost accounting. The new organization will take over the business of its predecessors on January 1, 1911.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from store—		Galvanized.		Tin—	
Refined Iron:		No. 22 and 24	per lb. \$ 5.75c	Straits Pig.....	
1 to 1 1/4 in. round and square.....	per lb. \$ 1.90c	No. 26	per lb. \$ 6.25c	Copper—	
1 1/2 to 4 in. x 1/2 to 1 in.....	per lb. \$ 2.10c	No. 28	per lb. \$ 7.25c	Lake Ingot.....	
Rods—3/8 and 11-16 round and square.....	per lb. \$ 2.10c	Corrugated Roofing—		Electrolytic.....	
Angles:		2 1/2 in. corrugated.....	per 100 sq. ft. \$ 4.80	Casting.....	
8 in. x 1/2 in. and larger.....	per lb. \$ 2.10c	No. 24.....	per 100 sq. ft. \$ 4.80	Spelter—	
8 in. x 8-16 in. and 1/2 in.....	per lb. \$ 2.10c	No. 26.....	per 100 sq. ft. \$ 4.80	Western.....	
1 1/2 to 2 1/2 in. x 1/2 in.....	per lb. \$ 2.10c	No. 28.....	per 100 sq. ft. \$ 4.80	Zinc.	
1 1/2 to 2 1/2 in. x 3-16 in. and thicker.....	per lb. \$ 2.10c	Tin Plates—		No. 9, base, casks.....	
1 to 1 1/4 in. x 3-16 in.....	per lb. \$ 2.10c	American Charcoal Plates (per box.)		Lead.	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	"A. A. A." Charcoal:		American Pig.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Bar.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Solder.	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		No. 1, guaranteed.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		No. 1, refined.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Prices of Solder indicated by private brand vary according to composition.	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Antimony—	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Cookson.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Hallett.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Other Brands.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Bismuth—	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Per lb. \$ 2.00	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Aluminum—	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Rods & Wire.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Sheets.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Old Metals.	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Dealers' Purchasing Prices Paid in New York	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Copper, Heavy cut and crucible.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Copper, Heavy and Wire.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Copper, Light and Bottoms.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Brass, Heavy.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Brass, Light.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Heavy Machine Composition.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Clean Brass Turnings.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Composition Turnings.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Lead, Heavy.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Lead, Tea.....	
1 to 1 1/4 in. x 1/2 in.....	per lb. \$ 2.10c	IX, 14 x 20.....		Zinc Scrap.....	

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